SEQUENCE LISTING

<110> Carozzi, Nadine
Hargiss, Tracy
Koziel, Michael G.
Duck, Nicholas B.
Carr, Brian

<120> AXMI-014, A Delta-Endotoxin Gene and Methods for Its Use

<130> 045600/274143

<150> 60/448,632
<151> 2003-02-20

<160> 23

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<213> Bacillus thuringiensis

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<220>
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gat ggt tcc ccg aat aac aca aat atg tca aac aga tat cct ttt gca   96
Asp Gly Ser Pro Asn Asn Thr Asn Met Ser Asn Arg Tyr Pro Phe Ala
             20                  25                  30

aag gat cca aat ata ttt cct att aac ctg gac gct tgt cag gga agg   144
Lys Asp Pro Asn Ile Phe Pro Ile Asn Leu Asp Ala Cys Gln Gly Arg
         35                  40                  45

cca tgg caa gat acg tgg gaa tca gtc tcg gat ata gta act att ggg   192
Pro Trp Gln Asp Thr Trp Glu Ser Val Ser Asp Ile Val Thr Ile Gly
     50                  55                  60

aca tac ctt ata caa ttc ttg cta gaa ccc ggt ata ggt gga att cct   240
Thr Tyr Leu Ile Gln Phe Leu Leu Glu Pro Gly Ile Gly Gly Ile Pro
 65                  70                  75                  80

gta ata ttt tca ata ata aac aaa ctc att ccg tct tct ggt caa tct   288
Val Ile Phe Ser Ile Ile Asn Lys Leu Ile Pro Ser Ser Gly Gln Ser
                 85                  90                  95

gtg gca gca ctt tct ata tgt gat tta gta tct ata att cgt aaa gag   336
Val Ala Ala Leu Ser Ile Cys Asp Leu Val Ser Ile Ile Arg Lys Glu
            100                 105                 110

gta gac gag agc gtg tta agt gac ggg gtt gca gat ttt gag ggt gaa   384
Val Asp Glu Ser Val Leu Ser Asp Gly Val Ala Asp Phe Glu Gly Glu
        115                 120                 125

atg act gct tat caa gat tat tat ctt cat tat ctt gag gat tgg ctt   432
Met Thr Ala Tyr Gln Asp Tyr Tyr Leu His Tyr Leu Glu Asp Trp Leu
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Thr Asp Lys Ser Asn Pro Lys Lys Leu Ala Asp Val Val Lys Gln Phe
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caa gca cgg gaa gaa gat ttc act aaa ctt tta gca ggg tca tta tca   528
Gln Ala Arg Glu Glu Asp Phe Thr Lys Leu Leu Ala Gly Ser Leu Ser
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aga cag aaa gct gaa ata tta tta ttg cct acg tat gtg caa gct gca   576
Arg Gln Lys Ala Glu Ile Leu Leu Leu Pro Thr Tyr Val Gln Ala Ala
            180                 185                 190

aat gtg cat tta tta cta tta agg gac gca gtt aaa tat aaa aaa gaa   624
Asn Val His Leu Leu Leu Leu Arg Asp Ala Val Lys Tyr Lys Lys Glu
        195                 200                 205

tgg gga cta gtg tgt cca ccg ttg tat cca ggg tca ggg aga act gat   672
Trp Gly Leu Val Cys Pro Pro Leu Tyr Pro Gly Ser Gly Arg Thr Asp
    210                 215                 220

tgt aac gag cgg tta aaa gcg aaa ata aaa gag tat act aat tat tgt   720
Cys Asn Glu Arg Leu Lys Ala Lys Ile Lys Glu Tyr Thr Asn Tyr Cys
225                 230                 235                 240

gta ggg tgg tat aac aag ggt tta gat cag ata aga cag gcg ggt aca   768
Val Gly Trp Tyr Asn Lys Gly Leu Asp Gln Ile Arg Gln Ala Gly Thr
                245                 250                 255

agt gct gaa gtt tgg tcg aaa ttt aat aaa ttt cgt aga gaa atg acg   816
Ser Ala Glu Val Trp Ser Lys Phe Asn Lys Phe Arg Arg Glu Met Thr
            260                 265                 270

ttg gcg gta ttg gat att att gct ata ttt cca act tat gat ttt gaa   864
Leu Ala Val Leu Asp Ile Ile Ala Ile Phe Pro Thr Tyr Asp Phe Glu
        275                 280                 285

aaa tat cca tta gca aca agt gta gag tta act agg gaa att tat aca   912
Lys Tyr Pro Leu Ala Thr Ser Val Glu Leu Thr Arg Glu Ile Tyr Thr
    290                 295                 300

gat cca gtg gga tat tca ggg gga aat tat ggt tgg gaa cgg ttt ttt   960
Asp Pro Val Gly Tyr Ser Gly Gly Asn Tyr Gly Trp Glu Arg Phe Phe
305                 310                 315                 320

agc ttt aat tcg gta gaa gca aat gga aca cgg gga cct ggt tta gtt   1008
Ser Phe Asn Ser Val Glu Ala Asn Gly Thr Arg Gly Pro Gly Leu Val
                325                 330                 335

act tgg ctt caa gct ata gat ata tat agt cat tct att aat ctt cag   1056
Thr Trp Leu Gln Ala Ile Asp Ile Tyr Ser His Ser Ile Asn Leu Gln
            340                 345                 350

ctt ggt tat ctt agt ggc tgg ggg gga act cgt cat tat gaa gac ttc   1104
Leu Gly Tyr Leu Ser Gly Trp Gly Gly Thr Arg His Tyr Glu Asp Phe
        355                 360                 365

aca aag ggt aac ggt gct ttt caa cgt atg tct gga act acg agt aat   1152
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    370                 375                 380

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Asn Pro Arg Asn Ile Ile Phe Gly Asn Thr Asp Ile Phe Lys Ile Ile
385                 390                 395                 400

tca tta gct aga tat gca atg caa ccg ttt gtt ggg tat tca atc cca   1248
Ser Leu Ala Arg Tyr Ala Met Gln Pro Phe Val Gly Tyr Ser Ile Pro
                405                 410                 415

cgg cat ctt gtt tca cgt gca gaa ttt ttt ccg aca aca cta aat act   1296
Arg His Leu Val Ser Arg Ala Glu Phe Phe Pro Thr Thr Leu Asn Thr
            420                 425                 430

ttc ctg tat gag gta aac agt tct ggg tac tca cag aca att gaa tct   1344
Phe Leu Tyr Glu Val Asn Ser Ser Gly Tyr Ser Gln Thr Ile Glu Ser
        435                 440                 445

gtg tta cca ggt att aat aag gat cta cca cct agt cgt aca aat tac   1392
Val Leu Pro Gly Ile Asn Lys Asp Leu Pro Pro Ser Arg Thr Asn Tyr
    450                 455                 460

tct cat aga tta tca aat gcg gca tgt gtt caa aat gaa acc tcc aga   1440
Ser His Arg Leu Ser Asn Ala Ala Cys Val Gln Asn Glu Thr Ser Arg
465                 470                 475                 480

gtt aac gta ttt ggt tgg aca cat aca agt atg aaa aaa gat aat cga   1488
Val Asn Val Phe Gly Trp Thr His Thr Ser Met Lys Lys Asp Asn Arg
                485                 490                 495

att tat cca gat aaa att acg caa att cct gca gta aaa gct ttt gcc   1536
Ile Tyr Pro Asp Lys Ile Thr Gln Ile Pro Ala Val Lys Ala Phe Ala
            500                 505                 510

cta cca gca ggt aca gga tat gca gga ggt tac gtc aca gct ggg cct   1584
Leu Pro Ala Gly Thr Gly Tyr Ala Gly Gly Tyr Val Thr Ala Gly Pro
        515                 520                 525

ggt tat aca gga gga gat gta gta acg tta cct tat caa gca agt tta   1632
Gly Tyr Thr Gly Gly Asp Val Val Thr Leu Pro Tyr Gln Ala Ser Leu
    530                 535                 540

aaa ata cgt tta act tct gca ccc acg aat aaa aat tac cgt gtt aga   1680
Lys Ile Arg Leu Thr Ser Ala Pro Thr Asn Lys Asn Tyr Arg Val Arg
545                 550                 555                 560

ctt cgc tac gcg agt gga gga cct ggt ccg ttc cga gta gaa aga tgg   1728
Leu Arg Tyr Ala Ser Gly Gly Pro Gly Pro Phe Arg Val Glu Arg Trp
                565                 570                 575

tcg cca agt tct gtt tca aat gct aat ttt tct cgt cca gct aca ggt   1776
Ser Pro Ser Ser Val Ser Asn Ala Asn Phe Ser Arg Pro Ala Thr Gly
            580                 585                 590

ggc tat agt tca ttt gat tat gtg gac acc tta gtt act aca ttt aat   1824
Gly Tyr Ser Ser Phe Asp Tyr Val Asp Thr Leu Val Thr Thr Phe Asn
        595                 600                 605
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caa tca ggt gtt gaa ata att ata caa aat cta tct ggt tac cac ctt   1872
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    610                 615                 620

att gtt gac aaa gtc gaa ttt atc cca att gac atc caa att gaa aaa   1920
Ile Val Asp Lys Val Glu Phe Ile Pro Ile Asp Ile Gln Ile Glu Lys
625                 630                 635                 640

tgt acg aaa tgt caa ttc gaa gga gac ata tgt aga tgt gaa gga gta   1968
Cys Thr Lys Cys Gln Phe Glu Gly Asp Ile Cys Arg Cys Glu Gly Val
                645                 650                 655

caa tcc ttg gaa aca aaa aaa gag att gta aat agt tta ttt atc aat   2016
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taa                                                             2019
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Lys Asp Pro Asn Ile Phe Pro Ile Asn Leu Asp Ala Cys Gln Gly Arg
        35                  40                  45
Pro Trp Gln Asp Thr Trp Glu Ser Val Ser Asp Ile Val Thr Ile Gly
    50                  55                  60
Thr Tyr Leu Ile Gln Phe Leu Leu Glu Pro Gly Ile Gly Gly Ile Pro
65                  70                  75                  80
Val Ile Phe Ser Ile Ile Asn Lys Leu Ile Pro Ser Ser Gly Gln Ser
                85                  90                  95
Val Ala Ala Leu Ser Ile Cys Asp Leu Val Ser Ile Ile Arg Lys Glu
            100                 105                 110
Val Asp Glu Ser Val Leu Ser Asp Gly Val Ala Asp Phe Glu Gly Glu
        115                 120                 125
Met Thr Ala Tyr Gln Asp Tyr Tyr Leu His Tyr Leu Glu Asp Trp Leu
    130                 135                 140
Thr Asp Lys Ser Asn Pro Lys Lys Leu Ala Asp Val Val Lys Gln Phe
145                 150                 155                 160
Gln Ala Arg Glu Glu Asp Phe Thr Lys Leu Leu Ala Gly Ser Leu Ser
                165                 170                 175
Arg Gln Lys Ala Glu Ile Leu Leu Leu Pro Thr Tyr Val Gln Ala Ala
            180                 185                 190
Asn Val His Leu Leu Leu Leu Arg Asp Ala Val Lys Tyr Lys Lys Glu
        195                 200                 205
Trp Gly Leu Val Cys Pro Pro Leu Tyr Pro Gly Ser Gly Arg Thr Asp
    210                 215                 220
Cys Asn Glu Arg Leu Lys Ala Lys Ile Lys Glu Tyr Thr Asn Tyr Cys
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225                 230                 235                 240
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                245                 250                 255
Ser Ala Glu Val Trp Ser Lys Phe Asn Lys Phe Arg Arg Glu Met Thr
            260                 265                 270
Leu Ala Val Leu Asp Ile Ile Ala Ile Phe Pro Thr Tyr Asp Phe Glu
        275                 280                 285
Lys Tyr Pro Leu Ala Thr Ser Val Glu Leu Thr Arg Glu Ile Tyr Thr
    290                 295                 300
Asp Pro Val Gly Tyr Ser Gly Gly Asn Tyr Gly Trp Glu Arg Phe Phe
305                 310                 315                 320
Ser Phe Asn Ser Val Glu Ala Asn Gly Thr Arg Gly Pro Gly Leu Val
                325                 330                 335
Thr Trp Leu Gln Ala Ile Asp Ile Tyr Ser His Ser Ile Asn Leu Gln
            340                 345                 350
Leu Gly Tyr Leu Ser Gly Trp Gly Gly Thr Arg His Tyr Glu Asp Phe
        355                 360                 365
Thr Lys Gly Asn Gly Ala Phe Gln Arg Met Ser Gly Thr Thr Ser Asn
    370                 375                 380
Asn Pro Arg Asn Ile Ile Phe Gly Asn Thr Asp Ile Phe Lys Ile Ile
385                 390                 395                 400
Ser Leu Ala Arg Tyr Ala Met Gln Pro Phe Val Gly Tyr Ser Ile Pro
                405                 410                 415
Arg His Leu Val Ser Arg Ala Glu Phe Phe Pro Thr Thr Leu Asn Thr
            420                 425                 430
Phe Leu Tyr Glu Val Asn Ser Ser Gly Tyr Ser Gln Thr Ile Glu Ser
        435                 440                 445
Val Leu Pro Gly Ile Asn Lys Asp Leu Pro Pro Ser Arg Thr Asn Tyr
    450                 455                 460
Ser His Arg Leu Ser Asn Ala Ala Cys Val Gln Asn Glu Thr Ser Arg
465                 470                 475                 480
Val Asn Val Phe Gly Trp Thr His Thr Ser Met Lys Lys Asp Asn Arg
                485                 490                 495
Ile Tyr Pro Asp Lys Ile Thr Gln Ile Pro Ala Val Lys Ala Phe Ala
            500                 505                 510
Leu Pro Ala Gly Thr Gly Tyr Ala Gly Gly Tyr Val Thr Ala Gly Pro
        515                 520                 525
Gly Tyr Thr Gly Gly Asp Val Val Thr Leu Pro Tyr Gln Ala Ser Leu
    530                 535                 540
Lys Ile Arg Leu Thr Ser Ala Pro Thr Asn Lys Asn Tyr Arg Val Arg
545                 550                 555                 560
Leu Arg Tyr Ala Ser Gly Gly Pro Gly Pro Phe Arg Val Glu Arg Trp
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Ser Pro Ser Ser Val Ser Asn Ala Asn Phe Ser Arg Pro Ala Thr Gly
            580                 585                 590
Gly Tyr Ser Ser Phe Asp Tyr Val Asp Thr Leu Val Thr Thr Phe Asn
        595                 600                 605
Gln Ser Gly Val Glu Ile Ile Ile Gln Asn Leu Ser Gly Tyr His Leu
    610                 615                 620
Ile Val Asp Lys Val Glu Phe Ile Pro Ile Asp Ile Gln Ile Glu Lys
625                 630                 635                 640
Cys Thr Lys Cys Gln Phe Glu Gly Asp Ile Cys Arg Cys Glu Gly Val
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ccg aat aac aca aat atg tca aac aga tat cct ttt gca aag gat cca   96
Pro Asn Asn Thr Asn Met Ser Asn Arg Tyr Pro Phe Ala Lys Asp Pro
            20                  25                  30

aat ata ttt cct att aac ctg gac gct tgt cag gga agg cca tgg caa   144
Asn Ile Phe Pro Ile Asn Leu Asp Ala Cys Gln Gly Arg Pro Trp Gln
        35                  40                  45

gat acg tgg gaa tca gtc tcg gat ata gta act att ggg aca tac ctt   192
Asp Thr Trp Glu Ser Val Ser Asp Ile Val Thr Ile Gly Thr Tyr Leu
    50                  55                  60

ata caa ttc ttg cta gaa ccc ggt ata ggt gga att cct gta ata ttt   240
Ile Gln Phe Leu Leu Glu Pro Gly Ile Gly Gly Ile Pro Val Ile Phe
65                  70                  75                  80

tca ata ata aac aaa ctc att ccg tct tct ggt caa tct gtg gca gca   288
Ser Ile Ile Asn Lys Leu Ile Pro Ser Ser Gly Gln Ser Val Ala Ala
                85                  90                  95

ctt tct ata tgt gat tta gta tct ata att cgt aaa gag gta gac gag   336
Leu Ser Ile Cys Asp Leu Val Ser Ile Ile Arg Lys Glu Val Asp Glu
            100                 105                 110

agc gtg tta agt gac ggg gtt gca gat ttt gag ggt gaa atg act gct   384
Ser Val Leu Ser Asp Gly Val Ala Asp Phe Glu Gly Glu Met Thr Ala
        115                 120                 125

tat caa gat tat tat ctt cat tat ctt gag gat tgg ctt aca gat aaa   432
Tyr Gln Asp Tyr Tyr Leu His Tyr Leu Glu Asp Trp Leu Thr Asp Lys
    130                 135                 140

tca aat cct aaa aaa ctt gct gac gta gtt aaa cag ttc caa gca cgg   480
Ser Asn Pro Lys Lys Leu Ala Asp Val Val Lys Gln Phe Gln Ala Arg
145                 150                 155                 160

gaa gaa gat ttc act aaa ctt tta gca ggg tca tta tca aga cag aaa   528
Glu Glu Asp Phe Thr Lys Leu Leu Ala Gly Ser Leu Ser Arg Gln Lys
                165                 170                 175

gct gaa ata tta tta ttg cct acg tat gtg caa gct gca aat gtg cat   576
Ala Glu Ile Leu Leu Leu Pro Thr Tyr Val Gln Ala Ala Asn Val His
            180                 185                 190
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```
tta tta cta tta agg gac gca gtt aaa tat aaa aaa gaa tgg gga cta   624
Leu Leu Leu Leu Arg Asp Ala Val Lys Tyr Lys Lys Glu Trp Gly Leu
        195                 200                 205

gtg tgt cca ccg ttg tat cca ggg tca ggg aga act gat tgt aac gag   672
Val Cys Pro Pro Leu Tyr Pro Gly Ser Gly Arg Thr Asp Cys Asn Glu
    210                 215                 220

cgg tta aaa gcg aaa ata aaa gag tat act aat tat tgt gta ggg tgg   720
Arg Leu Lys Ala Lys Ile Lys Glu Tyr Thr Asn Tyr Cys Val Gly Trp
225                 230                 235                 240

tat aac aag ggt tta gat cag ata aga cag gcg ggt aca agt gct gaa   768
Tyr Asn Lys Gly Leu Asp Gln Ile Arg Gln Ala Gly Thr Ser Ala Glu
                245                 250                 255

gtt tgg tcg aaa ttt aat aaa ttt cgt aga gaa atg acg ttg gcg gta   816
Val Trp Ser Lys Phe Asn Lys Phe Arg Arg Glu Met Thr Leu Ala Val
            260                 265                 270

ttg gat att att gct ata ttt cca act tat gat ttt gaa aaa tat cca   864
Leu Asp Ile Ile Ala Ile Phe Pro Thr Tyr Asp Phe Glu Lys Tyr Pro
        275                 280                 285

tta gca aca agt gta gag tta act agg gaa att tat aca gat cca gtg   912
Leu Ala Thr Ser Val Glu Leu Thr Arg Glu Ile Tyr Thr Asp Pro Val
    290                 295                 300

gga tat tca ggg gga aat tat ggt tgg gaa cgg ttt ttt agc ttt aat   960
Gly Tyr Ser Gly Gly Asn Tyr Gly Trp Glu Arg Phe Phe Ser Phe Asn
305                 310                 315                 320

tcg gta gaa gca aat gga aca cgg gga cct ggt tta gtt act tgg ctt   1008
Ser Val Glu Ala Asn Gly Thr Arg Gly Pro Gly Leu Val Thr Trp Leu
                325                 330                 335

caa gct ata gat ata tat agt cat tct att aat ctt cag ctt ggt tat   1056
Gln Ala Ile Asp Ile Tyr Ser His Ser Ile Asn Leu Gln Leu Gly Tyr
            340                 345                 350

ctt agt ggc tgg ggg gga act cgt cat tat gaa gac ttc aca aag ggt   1104
Leu Ser Gly Trp Gly Gly Thr Arg His Tyr Glu Asp Phe Thr Lys Gly
        355                 360                 365

aac ggt gct ttt caa cgt atg tct gga act acg agt aat aat cca cgt   1152
Asn Gly Ala Phe Gln Arg Met Ser Gly Thr Thr Ser Asn Asn Pro Arg
    370                 375                 380

aat att att ttt ggc aat acc gat ata ttt aaa att att tca tta gct   1200
Asn Ile Ile Phe Gly Asn Thr Asp Ile Phe Lys Ile Ile Ser Leu Ala
385                 390                 395                 400

aga tat gca atg caa ccg ttt gtt ggg tat tca atc cca cgg cat ctt   1248
Arg Tyr Ala Met Gln Pro Phe Val Gly Tyr Ser Ile Pro Arg His Leu
                405                 410                 415
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gtt tca cgt gca gaa ttt ttt ccg aca aca cta aat act ttc ctg tat   1296
Val Ser Arg Ala Glu Phe Phe Pro Thr Thr Leu Asn Thr Phe Leu Tyr
            420                 425                 430

gag gta aac agt tct ggg tac tca cag aca att gaa tct gtg tta cca   1344
Glu Val Asn Ser Ser Gly Tyr Ser Gln Thr Ile Glu Ser Val Leu Pro
        435                 440                 445

ggt att aat aag gat cta cca cct agt cgt aca aat tac tct cat aga   1392
Gly Ile Asn Lys Asp Leu Pro Pro Ser Arg Thr Asn Tyr Ser His Arg
    450                 455                 460

tta tca aat gcg gca tgt gtt caa aat gaa acc tcc aga gtt aac gta   1440
Leu Ser Asn Ala Ala Cys Val Gln Asn Glu Thr Ser Arg Val Asn Val
465                 470                 475                 480

ttt ggt tgg aca cat aca agt atg aaa aaa gat aat cga att tat cca   1488
Phe Gly Trp Thr His Thr Ser Met Lys Lys Asp Asn Arg Ile Tyr Pro
                485                 490                 495

gat aaa att acg caa att cct gca gta aaa gct ttt gcc cta cca gca   1536
Asp Lys Ile Thr Gln Ile Pro Ala Val Lys Ala Phe Ala Leu Pro Ala
            500                 505                 510

ggt aca gga tat gca gga ggt tac gtc aca gct ggg cct ggt tat aca   1584
Gly Thr Gly Tyr Ala Gly Gly Tyr Val Thr Ala Gly Pro Gly Tyr Thr
        515                 520                 525

gga gga gat gta gta acg tta cct tat caa gca agt tta aaa ata cgt   1632
Gly Gly Asp Val Val Thr Leu Pro Tyr Gln Ala Ser Leu Lys Ile Arg
    530                 535                 540

tta act tct gca ccc acg aat aaa aat tac cgt gtt aga ctt cgc tac   1680
Leu Thr Ser Ala Pro Thr Asn Lys Asn Tyr Arg Val Arg Leu Arg Tyr
545                 550                 555                 560

gcg agt gga gga cct ggt ccg ttc cga gta gaa aga tgg tcg cca agt   1728
Ala Ser Gly Gly Pro Gly Pro Phe Arg Val Glu Arg Trp Ser Pro Ser
                565                 570                 575

tct gtt tca aat gct aat ttt tct cgt cca gct aca ggt ggc tat agt   1776
Ser Val Ser Asn Ala Asn Phe Ser Arg Pro Ala Thr Gly Gly Tyr Ser
            580                 585                 590

tca ttt gat tat gtg gac acc tta gtt act aca ttt aat caa tca ggt   1824
Ser Phe Asp Tyr Val Asp Thr Leu Val Thr Thr Phe Asn Gln Ser Gly
        595                 600                 605

gtt gaa ata att ata caa aat cta tct ggt tac cac ctt att gtt gac   1872
Val Glu Ile Ile Ile Gln Asn Leu Ser Gly Tyr His Leu Ile Val Asp
    610                 615                 620

aaa gtc gaa ttt atc cca att gac atc caa att gaa aaa tgt acg aaa   1920
Lys Val Glu Phe Ile Pro Ile Asp Ile Gln Ile Glu Lys Cys Thr Lys
625                 630                 635                 640

tgt caa ttc gaa gga gac ata tgt aga tgt gaa gga gta caa tcc ttg   1968
```

```
Cys Gln Phe Glu Gly Asp Ile Cys Arg Cys Glu Gly Val Gln Ser Leu
                645                 650                 655

gaa aca aaa aaa gag att gta aat agt tta ttt atc aat taa          2010
Glu Thr Lys Lys Glu Ile Val Asn Ser Leu Phe Ile Asn  *
            660                 665
```

<210> 5
<211> 669
<212> PRT
<213> Bacillus thuringiensis

<400> 5

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Met Asn Ser Tyr Gln Asn Thr Asn Glu Tyr Glu Ile Leu Asp Gly Ser
 1               5                  10                  15
Pro Asn Asn Thr Asn Met Ser Asn Arg Tyr Pro Phe Ala Lys Asp Pro
            20                  25                  30
Asn Ile Phe Pro Ile Asn Leu Asp Ala Cys Gln Gly Arg Pro Trp Gln
        35                  40                  45
Asp Thr Trp Glu Ser Val Ser Asp Ile Val Thr Ile Gly Thr Tyr Leu
    50                  55                  60
Ile Gln Phe Leu Leu Glu Pro Gly Ile Gly Gly Ile Pro Val Ile Phe
65                  70                  75                  80
Ser Ile Ile Asn Lys Leu Ile Pro Ser Ser Gly Gln Ser Val Ala Ala
                85                  90                  95
Leu Ser Ile Cys Asp Leu Val Ser Ile Ile Arg Lys Glu Val Asp Glu
            100                 105                 110
Ser Val Leu Ser Asp Gly Val Ala Asp Phe Glu Gly Glu Met Thr Ala
        115                 120                 125
Tyr Gln Asp Tyr Tyr Leu His Tyr Leu Glu Asp Trp Leu Thr Asp Lys
    130                 135                 140
Ser Asn Pro Lys Lys Leu Ala Asp Val Val Lys Gln Phe Gln Ala Arg
145                 150                 155                 160
Glu Glu Asp Phe Thr Lys Leu Leu Ala Gly Ser Leu Ser Arg Gln Lys
                165                 170                 175
Ala Glu Ile Leu Leu Leu Pro Thr Tyr Val Gln Ala Ala Asn Val His
            180                 185                 190
Leu Leu Leu Leu Arg Asp Ala Val Lys Tyr Lys Lys Glu Trp Gly Leu
        195                 200                 205
Val Cys Pro Pro Leu Tyr Pro Gly Ser Gly Arg Thr Asp Cys Asn Glu
    210                 215                 220
Arg Leu Lys Ala Lys Ile Lys Glu Tyr Thr Asn Tyr Cys Val Gly Trp
225                 230                 235                 240
Tyr Asn Lys Gly Leu Asp Gln Ile Arg Gln Ala Gly Thr Ser Ala Glu
                245                 250                 255
Val Trp Ser Lys Phe Asn Lys Phe Arg Arg Glu Met Thr Leu Ala Val
            260                 265                 270
Leu Asp Ile Ile Ala Ile Phe Pro Thr Tyr Asp Phe Glu Lys Tyr Pro
        275                 280                 285
Leu Ala Thr Ser Val Glu Leu Thr Arg Glu Ile Tyr Thr Asp Pro Val
    290                 295                 300
Gly Tyr Ser Gly Gly Asn Tyr Gly Trp Glu Arg Phe Phe Ser Phe Asn
305                 310                 315                 320
Ser Val Glu Ala Asn Gly Thr Arg Gly Pro Gly Leu Val Thr Trp Leu
                325                 330                 335
```

```
Gln Ala Ile Asp Ile Tyr Ser His Ser Ile Asn Leu Gln Leu Gly Tyr
            340                 345                 350
Leu Ser Gly Trp Gly Gly Thr Arg His Tyr Glu Asp Phe Thr Lys Gly
        355                 360                 365
Asn Gly Ala Phe Gln Arg Met Ser Gly Thr Thr Ser Asn Asn Pro Arg
    370                 375                 380
Asn Ile Ile Phe Gly Asn Thr Asp Ile Phe Lys Ile Ile Ser Leu Ala
385                 390                 395                 400
Arg Tyr Ala Met Gln Pro Phe Val Gly Tyr Ser Ile Pro Arg His Leu
                405                 410                 415
Val Ser Arg Ala Glu Phe Phe Pro Thr Thr Leu Asn Thr Phe Leu Tyr
            420                 425                 430
Glu Val Asn Ser Ser Gly Tyr Ser Gln Thr Ile Glu Ser Val Leu Pro
        435                 440                 445
Gly Ile Asn Lys Asp Leu Pro Pro Ser Arg Thr Asn Tyr Ser His Arg
    450                 455                 460
Leu Ser Asn Ala Ala Cys Val Gln Asn Glu Thr Ser Arg Val Asn Val
465                 470                 475                 480
Phe Gly Trp Thr His Thr Ser Met Lys Lys Asp Asn Arg Ile Tyr Pro
                485                 490                 495
Asp Lys Ile Thr Gln Ile Pro Ala Val Lys Ala Phe Ala Leu Pro Ala
            500                 505                 510
Gly Thr Gly Tyr Ala Gly Gly Tyr Val Thr Ala Gly Pro Gly Tyr Thr
        515                 520                 525
Gly Gly Asp Val Val Thr Leu Pro Tyr Gln Ala Ser Leu Lys Ile Arg
    530                 535                 540
Leu Thr Ser Ala Pro Thr Asn Lys Asn Tyr Arg Val Arg Leu Arg Tyr
545                 550                 555                 560
Ala Ser Gly Gly Pro Gly Pro Phe Arg Val Glu Arg Trp Ser Pro Ser
                565                 570                 575
Ser Val Ser Asn Ala Asn Phe Ser Arg Pro Ala Thr Gly Gly Tyr Ser
            580                 585                 590
Ser Phe Asp Tyr Val Asp Thr Leu Val Thr Thr Phe Asn Gln Ser Gly
        595                 600                 605
Val Glu Ile Ile Ile Gln Asn Leu Ser Gly Tyr His Leu Ile Val Asp
    610                 615                 620
Lys Val Glu Phe Ile Pro Ile Asp Ile Gln Ile Glu Lys Cys Thr Lys
625                 630                 635                 640
Cys Gln Phe Glu Gly Asp Ile Cys Arg Cys Glu Gly Val Gln Ser Leu
                645                 650                 655
Glu Thr Lys Lys Glu Ile Val Asn Ser Leu Phe Ile Asn
            660                 665
```

<210> 6
<211> 1176
<212> PRT
<213> Bacillus thuringiensis

<400> 6

```
Met Asp Asn Asn Pro Asn Ile Asn Glu Cys Ile Pro Tyr Asn Cys Leu
 1               5                  10                  15
Ser Asn Pro Glu Val Glu Val Leu Gly Gly Glu Arg Ile Glu Thr Gly
            20                  25                  30
Tyr Thr Pro Ile Asp Ile Ser Leu Ser Leu Thr Gln Phe Leu Leu Ser
        35                  40                  45
Glu Phe Val Pro Gly Ala Gly Phe Val Leu Gly Leu Val Asp Ile Ile
```

```
    50                  55                  60
Trp Gly Ile Phe Gly Pro Ser Gln Trp Asp Ala Phe Pro Val Gln Ile
65                  70                  75                  80
Glu Gln Leu Ile Asn Gln Arg Ile Glu Glu Phe Ala Arg Asn Gln Ala
                85                  90                  95
Ile Ser Arg Leu Glu Gly Leu Ser Asn Leu Tyr Gln Ile Tyr Ala Glu
            100                 105                 110
Ser Phe Arg Glu Trp Glu Ala Asp Pro Thr Asn Pro Ala Leu Arg Glu
        115                 120                 125
Glu Met Arg Ile Gln Phe Asn Asp Met Asn Ser Ala Leu Thr Thr Ala
    130                 135                 140
Ile Pro Leu Leu Ala Val Gln Asn Tyr Gln Val Pro Leu Leu Ser Val
145                 150                 155                 160
Tyr Val Gln Ala Ala Asn Leu His Leu Ser Val Leu Arg Asp Val Ser
                165                 170                 175
Val Phe Gly Gln Arg Trp Gly Phe Asp Ala Ala Thr Ile Asn Ser Arg
            180                 185                 190
Tyr Asn Asp Leu Thr Arg Leu Ile Gly Asn Tyr Thr Asp Tyr Ala Val
        195                 200                 205
Arg Trp Tyr Asn Thr Gly Leu Glu Arg Val Trp Gly Pro Asp Ser Arg
    210                 215                 220
Asp Trp Val Arg Tyr Asn Gln Phe Arg Arg Glu Leu Thr Leu Thr Val
225                 230                 235                 240
Leu Asp Ile Val Ala Leu Phe Ser Asn Tyr Asp Ser Arg Arg Tyr Pro
                245                 250                 255
Ile Arg Thr Val Ser Gln Leu Thr Arg Glu Ile Tyr Thr Asn Pro Val
            260                 265                 270
Leu Glu Asn Phe Asp Gly Ser Phe Arg Gly Met Ala Gln Arg Ile Glu
        275                 280                 285
Gln Asn Ile Arg Gln Pro His Leu Met Asp Ile Leu Asn Ser Ile Thr
    290                 295                 300
Ile Tyr Thr Asp Val His Arg Gly Phe Asn Tyr Trp Ser Gly His Gln
305                 310                 315                 320
Ile Thr Ala Ser Pro Val Gly Phe Ser Gly Pro Glu Phe Ala Phe Pro
                325                 330                 335
Leu Phe Gly Asn Ala Gly Asn Ala Ala Pro Pro Val Leu Val Ser Leu
            340                 345                 350
Thr Gly Leu Gly Ile Phe Arg Thr Leu Ser Ser Pro Leu Tyr Arg Arg
        355                 360                 365
Ile Ile Leu Gly Ser Gly Pro Asn Asn Gln Glu Leu Phe Val Leu Asp
    370                 375                 380
Gly Thr Glu Phe Ser Phe Ala Ser Leu Thr Thr Asn Leu Pro Ser Thr
385                 390                 395                 400
Ile Tyr Arg Gln Arg Gly Thr Val Asp Ser Leu Asp Val Ile Pro Pro
                405                 410                 415
Gln Asp Asn Ser Val Pro Pro Arg Ala Gly Phe Ser His Arg Leu Ser
            420                 425                 430
His Val Thr Met Leu Ser Gln Ala Ala Gly Ala Val Tyr Thr Leu Arg
        435                 440                 445
Ala Pro Thr Phe Ser Trp Gln His Arg Ser Ala Glu Phe Asn Asn Ile
    450                 455                 460
Ile Pro Ser Ser Gln Ile Thr Gln Ile Pro Leu Thr Lys Ser Thr Asn
465                 470                 475                 480
Leu Gly Ser Gly Thr Ser Val Val Lys Gly Pro Gly Phe Thr Gly Gly
                485                 490                 495
Asp Ile Leu Arg Arg Thr Ser Pro Gly Gln Ile Ser Thr Leu Arg Val
            500                 505                 510
```

```
Asn Ile Thr Ala Pro Leu Ser Gln Arg Tyr Arg Val Arg Ile Arg Tyr
        515                 520                 525
Ala Ser Thr Thr Asn Leu Gln Phe His Thr Ser Ile Asp Gly Arg Pro
    530                 535                 540
Ile Asn Gln Gly Asn Phe Ser Ala Thr Met Ser Ser Gly Ser Asn Leu
545                 550                 555                 560
Gln Ser Gly Ser Phe Arg Thr Val Gly Phe Thr Thr Pro Phe Asn Phe
                565                 570                 575
Ser Asn Gly Ser Ser Val Phe Thr Leu Ser Ala His Val Phe Asn Ser
            580                 585                 590
Gly Asn Glu Val Tyr Ile Asp Arg Ile Glu Phe Val Pro Ala Glu Val
        595                 600                 605
Thr Phe Glu Ala Glu Tyr Asp Leu Glu Arg Ala Gln Lys Ala Val Asn
    610                 615                 620
Glu Leu Phe Thr Ser Ser Asn Gln Ile Gly Leu Lys Thr Asp Val Thr
625                 630                 635                 640
Asp Tyr His Ile Asp Gln Val Ser Asn Leu Val Glu Cys Leu Ser Asp
                645                 650                 655
Glu Phe Cys Leu Asp Glu Lys Gln Glu Leu Ser Glu Lys Val Lys His
            660                 665                 670
Ala Lys Arg Leu Ser Asp Glu Arg Asn Leu Leu Gln Asp Pro Asn Phe
        675                 680                 685
Arg Gly Ile Asn Arg Gln Leu Asp Arg Gly Trp Arg Gly Ser Thr Asp
    690                 695                 700
Ile Thr Ile Gln Gly Gly Asp Asp Val Phe Lys Glu Asn Tyr Val Thr
705                 710                 715                 720
Leu Leu Gly Thr Phe Asp Glu Cys Tyr Pro Thr Tyr Leu Tyr Gln Lys
                725                 730                 735
Ile Asp Glu Ser Lys Leu Lys Ala Tyr Thr Arg Tyr Gln Leu Arg Gly
            740                 745                 750
Tyr Ile Glu Asp Ser Gln Asp Leu Glu Ile Tyr Leu Ile Arg Tyr Asn
        755                 760                 765
Ala Lys His Glu Thr Val Asn Val Pro Gly Thr Gly Ser Leu Trp Pro
    770                 775                 780
Leu Ser Ala Gln Ser Pro Ile Gly Lys Cys Gly Glu Pro Asn Arg Cys
785                 790                 795                 800
Ala Pro His Leu Glu Trp Asn Pro Asp Leu Asp Cys Ser Cys Arg Asp
                805                 810                 815
Gly Glu Lys Cys Ala His His Ser His His Phe Ser Leu Asp Ile Asp
            820                 825                 830
Val Gly Cys Thr Asp Leu Asn Glu Asp Leu Gly Val Trp Val Ile Phe
        835                 840                 845
Lys Ile Lys Thr Gln Asp Gly His Ala Arg Leu Gly Asn Leu Glu Phe
    850                 855                 860
Leu Glu Glu Lys Pro Leu Val Gly Glu Ala Leu Ala Arg Val Lys Arg
865                 870                 875                 880
Ala Glu Lys Lys Trp Arg Asp Lys Arg Glu Lys Leu Glu Trp Glu Thr
                885                 890                 895
Asn Ile Val Tyr Lys Glu Ala Lys Glu Ser Val Asp Ala Leu Phe Val
            900                 905                 910
Asn Ser Gln Tyr Asp Gln Leu Gln Ala Asp Thr Asn Ile Ala Met Ile
        915                 920                 925
His Ala Ala Asp Lys Arg Val His Ser Ile Arg Glu Ala Tyr Leu Pro
    930                 935                 940
Glu Leu Ser Val Ile Pro Gly Val Asn Ala Ala Ile Phe Glu Glu Leu
945                 950                 955                 960
Glu Gly Arg Ile Phe Thr Ala Phe Ser Leu Tyr Asp Ala Arg Asn Val
```

```
                965                 970                 975
Ile Lys Asn Gly Asp Phe Asn Asn Gly Leu Ser Cys Trp Asn Val Lys
            980                 985                 990
Gly His Val Asp Val Glu Glu Gln Asn Asn Gln Arg Ser Val Leu Val
        995                 1000                1005
Val Pro Glu Trp Glu Ala Glu Val Ser Gln Glu Val Arg Val Cys Pro
    1010                1015                1020
Gly Arg Gly Tyr Ile Leu Arg Val Thr Ala Tyr Lys Glu Gly Tyr Gly
1025                1030                1035                1040
Glu Gly Cys Val Thr Ile His Glu Ile Glu Asn Asn Thr Asp Glu Leu
                1045                1050                1055
Lys Phe Ser Asn Cys Val Glu Glu Glu Ile Tyr Pro Asn Asn Thr Val
            1060                1065                1070
Thr Cys Asn Asp Tyr Thr Val Asn Gln Glu Glu Tyr Gly Gly Ala Tyr
        1075                1080                1085
Thr Ser Arg Asn Arg Gly Tyr Asn Glu Ala Pro Ser Val Pro Ala Asp
    1090                1095                1100
Tyr Ala Ser Val Tyr Glu Glu Lys Ser Tyr Thr Asp Gly Arg Arg Glu
1105                1110                1115                1120
Asn Pro Cys Glu Phe Asn Arg Gly Tyr Arg Asp Tyr Thr Pro Leu Pro
                1125                1130                1135
Val Gly Tyr Val Thr Lys Glu Leu Glu Tyr Phe Pro Glu Thr Asp Lys
            1140                1145                1150
Val Trp Ile Glu Ile Gly Glu Thr Glu Gly Thr Phe Ile Val Asp Ser
        1155                1160                1165
Val Glu Leu Leu Leu Met Glu Glu
    1170                1175
```

<210> 7
<211> 1178
<212> PRT
<213> Bacillus thuringiensis

<400> 7

```
Met Asp Asn Asn Pro Asn Ile Asn Glu Cys Ile Pro Tyr Asn Cys Leu
 1               5                  10                  15
Ser Asn Pro Glu Val Glu Val Leu Gly Gly Glu Arg Ile Glu Thr Gly
            20                  25                  30
Tyr Thr Pro Ile Asp Ile Ser Leu Ser Leu Thr Gln Phe Leu Leu Ser
        35                  40                  45
Glu Phe Val Pro Gly Ala Gly Phe Val Leu Gly Leu Val Asp Ile Ile
    50                  55                  60
Trp Gly Ile Phe Gly Pro Ser Gln Trp Asp Ala Phe Leu Val Gln Ile
65                  70                  75                  80
Glu Gln Leu Ile Asn Gln Arg Ile Glu Glu Phe Ala Arg Asn Gln Ala
                85                  90                  95
Ile Ser Arg Leu Glu Gly Leu Ser Asn Leu Tyr Gln Ile Tyr Ala Glu
            100                 105                 110
Ser Phe Arg Glu Trp Glu Ala Asp Pro Thr Asn Pro Ala Leu Arg Glu
        115                 120                 125
Glu Met Arg Ile Gln Phe Asn Asp Met Asn Ser Ala Leu Thr Thr Ala
    130                 135                 140
Ile Pro Leu Phe Ala Val Gln Asn Tyr Gln Val Pro Leu Leu Ser Val
145                 150                 155                 160
Tyr Val Gln Ala Ala Asn Leu His Leu Ser Val Leu Arg Asp Val Ser
                165                 170                 175
```

```
Val Phe Gly Gln Arg Trp Gly Phe Asp Ala Ala Thr Ile Asn Ser Arg
            180                 185                 190
Tyr Asn Asp Leu Thr Arg Leu Ile Gly Asn Tyr Thr Asp Tyr Ala Val
        195                 200                 205
Arg Trp Tyr Asn Thr Gly Leu Glu Arg Val Trp Gly Pro Asp Ser Arg
    210                 215                 220
Asp Trp Val Arg Tyr Asn Gln Phe Arg Arg Glu Leu Thr Leu Thr Val
225                 230                 235                 240
Leu Asp Ile Val Ala Leu Phe Pro Asn Tyr Asp Ser Arg Arg Tyr Pro
                245                 250                 255
Ile Arg Thr Val Ser Gln Leu Thr Arg Glu Ile Tyr Thr Asn Pro Val
            260                 265                 270
Leu Glu Asn Phe Asp Gly Ser Phe Arg Gly Ser Ala Gln Gly Ile Glu
        275                 280                 285
Arg Ser Ile Arg Ser Pro His Leu Met Asp Ile Leu Asn Ser Ile Thr
    290                 295                 300
Ile Tyr Thr Asp Ala His Arg Gly Tyr Tyr Tyr Trp Ser Gly His Gln
305                 310                 315                 320
Ile Met Ala Ser Pro Val Gly Phe Ser Gly Pro Glu Phe Thr Phe Pro
                325                 330                 335
Leu Tyr Gly Thr Met Gly Asn Ala Ala Pro Gln Gln Arg Ile Val Ala
            340                 345                 350
Gln Leu Gly Gln Gly Val Tyr Arg Thr Leu Ser Ser Thr Leu Tyr Arg
        355                 360                 365
Arg Pro Phe Asn Ile Gly Ile Asn Asn Gln Gln Leu Ser Val Leu Asp
    370                 375                 380
Gly Thr Glu Phe Ala Tyr Gly Thr Ser Ser Asn Leu Pro Ser Ala Val
385                 390                 395                 400
Tyr Arg Lys Ser Gly Thr Val Asp Ser Leu Asp Glu Ile Pro Pro Gln
                405                 410                 415
Asn Asn Asn Val Pro Pro Arg Gln Gly Phe Ser His Arg Leu Ser His
            420                 425                 430
Val Ser Met Phe Arg Ser Gly Phe Ser Asn Ser Ser Val Ser Ile Ile
        435                 440                 445
Arg Ala Pro Met Phe Ser Trp Ile His Arg Ser Ala Glu Phe Asn Asn
    450                 455                 460
Ile Ile Ala Ser Asp Ser Ile Thr Gln Ile Pro Ala Val Lys Gly Asn
465                 470                 475                 480
Phe Leu Phe Asn Gly Ser Val Ile Ser Gly Pro Gly Phe Thr Gly Gly
                485                 490                 495
Asp Leu Val Arg Leu Asn Ser Ser Gly Asn Asn Ile Gln Asn Arg Gly
            500                 505                 510
Tyr Ile Glu Val Pro Ile His Phe Pro Ser Thr Ser Thr Arg Tyr Arg
        515                 520                 525
Val Arg Val Arg Tyr Ala Ser Val Thr Pro Ile His Leu Asn Val Asn
    530                 535                 540
Trp Gly Asn Ser Ser Ile Phe Ser Asn Thr Val Pro Ala Thr Ala Thr
545                 550                 555                 560
Ser Leu Asp Asn Leu Gln Ser Ser Asp Phe Gly Tyr Phe Glu Ser Ala
                565                 570                 575
Asn Ala Phe Thr Ser Ser Leu Gly Asn Ile Val Gly Val Arg Asn Phe
            580                 585                 590
Ser Gly Thr Ala Gly Val Ile Ile Asp Arg Phe Glu Phe Ile Pro Val
        595                 600                 605
Thr Ala Thr Leu Glu Ala Glu Tyr Asn Leu Glu Arg Ala Gln Lys Ala
    610                 615                 620
Val Asn Ala Leu Phe Thr Ser Thr Asn Gln Leu Gly Leu Lys Thr Asn
```

625 630 635 640
Val Thr Asp Tyr His Ile Asp Gln Val Ser Asn Leu Val Thr Tyr Leu
645 650 655
Ser Asp Glu Phe Cys Leu Asp Glu Lys Arg Glu Leu Ser Glu Lys Val
660 665 670
Lys His Ala Lys Arg Leu Ser Asp Glu Arg Asn Leu Leu Gln Asp Ser
675 680 685
Asn Phe Lys Asp Ile Asn Arg Gln Pro Glu Arg Gly Trp Gly Gly Ser
690 695 700
Thr Gly Ile Thr Ile Gln Gly Gly Asp Asp Val Phe Lys Glu Asn Tyr
705 710 715 720
Val Thr Leu Ser Gly Thr Phe Asp Glu Cys Tyr Pro Thr Tyr Leu Tyr
725 730 735
Gln Lys Ile Asp Glu Ser Lys Leu Lys Ala Phe Thr Arg Tyr Gln Leu
740 745 750
Arg Gly Tyr Ile Glu Asp Ser Gln Asp Leu Glu Ile Tyr Leu Ile Arg
755 760 765
Tyr Asn Ala Lys His Glu Thr Val Asn Val Pro Gly Thr Gly Ser Leu
770 775 780
Trp Pro Leu Ser Ala Gln Ser Pro Ile Gly Lys Cys Gly Glu Pro Asn
785 790 795 800
Arg Cys Ala Pro His Leu Glu Trp Asn Pro Asp Leu Asp Cys Ser Cys
805 810 815
Arg Asp Gly Glu Lys Cys Ala His His Ser His His Phe Ser Leu Asp
820 825 830
Ile Asp Val Gly Cys Thr Asp Leu Asn Glu Asp Leu Gly Val Trp Val
835 840 845
Ile Phe Lys Ile Lys Thr Gln Asp Gly His Ala Arg Leu Gly Asn Leu
850 855 860
Glu Phe Leu Glu Glu Lys Pro Leu Val Gly Glu Ala Leu Ala Arg Val
865 870 875 880
Lys Arg Ala Glu Lys Lys Trp Arg Asp Lys Arg Glu Lys Leu Glu Trp
885 890 895
Glu Thr Asn Ile Val Tyr Lys Glu Ala Lys Glu Ser Val Asp Ala Leu
900 905 910
Phe Val Asn Ser Gln Tyr Asp Gln Leu Gln Ala Asp Thr Asn Ile Ala
915 920 925
Met Ile His Ala Ala Asp Lys Arg Val His Ser Ile Arg Glu Ala Tyr
930 935 940
Leu Pro Glu Leu Ser Val Ile Pro Gly Val Asn Ala Ala Ile Phe Glu
945 950 955 960
Glu Leu Glu Gly Arg Ile Phe Thr Ala Phe Ser Leu Tyr Asp Ala Arg
965 970 975
Asn Val Ile Lys Asn Gly Asp Phe Asn Asn Gly Leu Ser Cys Trp Asn
980 985 990
Val Lys Gly His Val Asp Val Glu Glu Gln Asn Asn Gln Arg Ser Val
995 1000 1005
Leu Val Val Pro Glu Trp Glu Ala Glu Val Ser Gln Glu Val Arg Val
1010 1015 1020
Cys Pro Gly Arg Gly Tyr Ile Leu Arg Val Thr Ala Tyr Lys Glu Gly
1025 1030 1035 1040
Tyr Gly Glu Gly Cys Val Thr Ile His Glu Ile Glu Asn Asn Thr Asp
1045 1050 1055
Glu Leu Lys Phe Ser Asn Cys Val Glu Glu Glu Ile Tyr Pro Asn Asn
1060 1065 1070
Thr Val Thr Cys Asn Asp Tyr Thr Val Asn Gln Glu Glu Tyr Gly Gly
1075 1080 1085

```
Ala Tyr Thr Ser Arg Asn Arg Gly Tyr Asn Glu Ala Pro Ser Val Pro
    1090                1095                1100
Ala Asp Tyr Ala Ser Val Tyr Glu Glu Lys Ser Tyr Thr Asp Gly Arg
1105                1110                1115                1120
Arg Glu Asn Pro Cys Glu Phe Asn Arg Gly Tyr Arg Asp Tyr Thr Pro
                1125                1130                1135
Leu Pro Val Gly Tyr Val Thr Lys Glu Leu Glu Tyr Phe Pro Glu Thr
            1140                1145                1150
Asp Lys Val Trp Ile Glu Ile Gly Glu Thr Glu Gly Thr Phe Ile Val
        1155                1160                1165
Asp Ser Val Glu Leu Leu Leu Met Glu Glu
    1170                1175


<210> 8
<211> 719
<212> PRT
<213> Bacillus thuringiensis

<400> 8
Met Lys Leu Lys Asn Gln Asp Lys His Gln Ser Phe Ser Ser Asn Ala
 1               5                  10                  15
Lys Val Asp Lys Ile Ser Thr Asp Ser Leu Lys Asn Glu Thr Asp Ile
            20                  25                  30
Glu Leu Gln Asn Ile Asn His Glu Asp Cys Leu Lys Met Ser Glu Tyr
        35                  40                  45
Glu Asn Val Glu Pro Phe Val Ser Ala Ser Thr Ile Gln Thr Gly Ile
    50                  55                  60
Gly Ile Ala Gly Lys Ile Leu Gly Thr Leu Gly Val Pro Phe Ala Gly
65                  70                  75                  80
Gln Val Ala Ser Leu Tyr Ser Phe Ile Leu Gly Glu Leu Trp Pro Lys
                85                  90                  95
Gly Lys Asn Gln Trp Glu Ile Phe Met Glu His Val Glu Glu Ile Ile
            100                 105                 110
Asn Gln Lys Ile Ser Thr Tyr Ala Arg Asn Lys Ala Leu Thr Asp Leu
        115                 120                 125
Lys Gly Leu Gly Asp Ala Leu Ala Val Tyr His Asp Ser Leu Glu Ser
    130                 135                 140
Trp Val Gly Asn Arg Asn Asn Thr Arg Ala Arg Ser Val Val Lys Ser
145                 150                 155                 160
Gln Tyr Ile Ala Leu Glu Leu Met Phe Val Gln Lys Leu Pro Ser Phe
                165                 170                 175
Ala Val Ser Gly Glu Glu Val Pro Leu Leu Pro Ile Tyr Ala Gln Ala
            180                 185                 190
Ala Asn Leu His Leu Leu Leu Leu Arg Asp Ala Ser Ile Phe Gly Lys
        195                 200                 205
Glu Trp Gly Leu Ser Ser Ser Glu Ile Ser Thr Phe Tyr Asn Arg Gln
    210                 215                 220
Val Glu Arg Ala Gly Asp Tyr Ser Asp His Cys Val Lys Trp Tyr Ser
225                 230                 235                 240
Thr Gly Leu Asn Asn Leu Arg Gly Thr Asn Ala Glu Ser Trp Val Arg
                245                 250                 255
Tyr Asn Gln Phe Arg Arg Asp Met Thr Leu Met Val Leu Asp Leu Val
            260                 265                 270
Ala Leu Phe Pro Ser Tyr Asp Thr Gln Met Tyr Pro Ile Lys Thr Thr
        275                 280                 285
Ala Gln Leu Thr Arg Glu Val Tyr Thr Asp Ala Ile Gly Thr Val His
```

```
    290                 295                 300
Pro His Pro Ser Phe Thr Ser Thr Thr Trp Tyr Asn Asn Asn Ala Pro
305                 310                 315                 320
Ser Phe Ser Ala Ile Glu Ala Ala Val Val Arg Asn Pro His Leu Leu
                325                 330                 335
Asp Phe Leu Glu Gln Val Thr Ile Tyr Ser Leu Leu Ser Arg Trp Ser
            340                 345                 350
Asn Thr Gln Tyr Met Asn Met Trp Gly Gly His Lys Leu Glu Phe Arg
        355                 360                 365
Thr Ile Gly Gly Thr Leu Asn Ile Ser Thr Gln Gly Ser Thr Asn Thr
    370                 375                 380
Ser Ile Asn Pro Val Thr Leu Pro Phe Thr Ser Arg Asp Val Tyr Arg
385                 390                 395                 400
Thr Glu Ser Leu Ala Gly Leu Asn Leu Phe Leu Thr Gln Pro Val Asn
                405                 410                 415
Gly Val Pro Arg Val Asp Phe His Trp Lys Phe Val Thr His Pro Ile
            420                 425                 430
Ala Ser Asp Asn Phe Tyr Tyr Pro Gly Tyr Ala Gly Ile Gly Thr Gln
        435                 440                 445
Leu Gln Asp Ser Glu Asn Glu Leu Pro Pro Glu Ala Thr Gly Gln Pro
    450                 455                 460
Asn Tyr Glu Ser Tyr Ser His Arg Leu Ser His Ile Gly Leu Ile Ser
465                 470                 475                 480
Ala Ser His Val Lys Ala Leu Val Tyr Ser Trp Thr His Arg Ser Ala
                485                 490                 495
Asp Arg Thr Asn Thr Ile Glu Pro Asn Ser Ile Thr Gln Ile Pro Leu
            500                 505                 510
Val Lys Ala Phe Asn Leu Ser Ser Gly Ala Ala Val Val Arg Gly Pro
        515                 520                 525
Gly Phe Thr Gly Gly Asp Ile Leu Arg Arg Thr Asn Thr Gly Thr Phe
    530                 535                 540
Gly Asp Ile Arg Val Asn Ile Asn Pro Pro Phe Ala Gln Arg Tyr Arg
545                 550                 555                 560
Val Arg Ile Arg Tyr Ala Ser Thr Thr Asp Leu Gln Phe His Thr Ser
                565                 570                 575
Ile Asn Gly Lys Ala Ile Asn Gln Gly Asn Phe Ser Ala Thr Met Asn
            580                 585                 590
Arg Gly Glu Asp Leu Asp Tyr Lys Thr Phe Arg Thr Val Gly Phe Thr
        595                 600                 605
Thr Pro Phe Ser Phe Leu Asp Val Gln Ser Thr Phe Thr Ile Gly Ala
    610                 615                 620
Trp Asn Phe Ser Ser Gly Asn Glu Val Tyr Ile Asp Arg Ile Glu Phe
625                 630                 635                 640
Val Pro Val Glu Val Thr Tyr Glu Ala Glu Tyr Asp Phe Glu Lys Ala
                645                 650                 655
Gln Glu Lys Val Thr Ala Leu Phe Thr Ser Thr Asn Pro Arg Gly Leu
            660                 665                 670
Lys Thr Asp Val Lys Asp Tyr His Ile Asp Gln Val Ser Asn Leu Val
        675                 680                 685
Glu Ser Leu Ser Asp Glu Phe Tyr Leu Asp Glu Lys Arg Glu Leu Phe
    690                 695                 700
Glu Ile Val Lys Tyr Ala Lys Gln Leu His Ile Glu Arg Asn Met
705                 710                 715
```

<210> 9
<211> 633

<212> PRT
<213> Bacillus thuringiensis

<400> 9
Met Asn Asn Val Leu Asn Ser Gly Arg Thr Thr Ile Cys Asp Ala Tyr
 1   5   10   15
Asn Val Val Ala His Asp Pro Phe Ser Phe Glu His Lys Ser Leu Asp
            20   25   30
Thr Ile Gln Lys Glu Trp Met Glu Trp Lys Arg Thr Asp His Ser Leu
        35   40   45
Tyr Val Ala Pro Val Val Gly Thr Val Ser Ser Phe Leu Leu Lys Lys
    50   55   60
Val Gly Ser Leu Ile Gly Lys Arg Ile Leu Ser Glu Leu Trp Gly Ile
65   70   75   80
Ile Phe Pro Ser Gly Ser Thr Asn Leu Met Gln Asp Ile Leu Arg Glu
                85   90   95
Thr Glu Gln Phe Leu Asn Gln Arg Leu Asn Thr Asp Thr Leu Ala Arg
            100   105   110
Val Asn Ala Glu Leu Ile Gly Leu Gln Ala Asn Ile Arg Glu Phe Asn
        115   120   125
Gln Gln Val Asp Asn Phe Leu Asn Pro Thr Gln Asn Pro Val Pro Leu
    130   135   140
Ser Ile Thr Ser Ser Val Asn Thr Met Gln Gln Leu Phe Leu Asn Arg
145   150   155   160
Leu Pro Gln Phe Gln Ile Gln Gly Tyr Gln Leu Leu Leu Leu Pro Leu
                165   170   175
Phe Ala Gln Ala Ala Asn Met His Leu Ser Phe Ile Arg Asp Val Ile
            180   185   190
Leu Asn Ala Asp Glu Trp Gly Ile Ser Ala Ala Thr Leu Arg Thr Tyr
        195   200   205
Arg Asp Tyr Leu Arg Asn Tyr Thr Arg Asp Tyr Ser Asn Tyr Cys Ile
    210   215   220
Asn Thr Tyr Gln Thr Ala Phe Arg Gly Leu Asn Thr Arg Leu His Asp
225   230   235   240
Met Leu Glu Phe Arg Thr Tyr Met Phe Leu Asn Val Phe Glu Tyr Val
                245   250   255
Ser Ile Trp Ser Leu Phe Lys Tyr Gln Ser Leu Met Val Ser Ser Gly
            260   265   270
Ala Asn Leu Tyr Ala Ser Gly Ser Gly Pro Gln Gln Thr Gln Ser Phe
        275   280   285
Thr Ala Gln Asn Trp Pro Phe Leu Tyr Ser Leu Phe Gln Val Asn Ser
    290   295   300
Asn Tyr Ile Leu Ser Gly Ile Ser Gly Thr Arg Leu Ser Ile Thr Phe
305   310   315   320
Pro Asn Ile Gly Gly Leu Pro Gly Ser Thr Thr Thr His Ser Leu Asn
                325   330   335
Ser Ala Arg Val Asn Tyr Ser Gly Gly Val Ser Ser Gly Leu Ile Gly
            340   345   350
Ala Thr Asn Leu Asn His Asn Phe Asn Cys Ser Thr Val Leu Pro Pro
        355   360   365
Leu Ser Thr Pro Phe Val Arg Ser Trp Leu Asp Ser Gly Thr Asp Arg
    370   375   380
Glu Gly Val Ala Thr Ser Thr Asn Trp Gln Thr Glu Ser Phe Gln Thr
385   390   395   400
Thr Leu Ser Leu Arg Cys Gly Ala Phe Ser Ala Arg Gly Asn Ser Asn
                405   410   415
Tyr Phe Pro Asp Tyr Phe Ile Arg Asn Ile Ser Gly Val Pro Leu Val

```
            420                 425                 430
Ile Arg Asn Glu Asp Leu Thr Arg Pro Leu His Tyr Asn Gln Ile Arg
        435                 440                 445
Asn Ile Glu Ser Pro Ser Gly Thr Pro Gly Gly Ala Arg Ala Tyr Leu
    450                 455                 460
Val Ser Val His Asn Arg Lys Asn Asn Ile Tyr Ala Ala Asn Glu Asn
465                 470                 475                 480
Gly Thr Met Ile His Leu Ala Pro Glu Asp Tyr Thr Gly Phe Thr Ile
                485                 490                 495
Ser Pro Ile His Ala Thr Gln Val Asn Asn Gln Thr Arg Thr Phe Ile
            500                 505                 510
Ser Glu Lys Phe Gly Asn Gln Gly Asp Ser Leu Arg Phe Glu Gln Ser
        515                 520                 525
Asn Thr Thr Ala Arg Tyr Thr Leu Arg Gly Asn Gly Asn Ser Tyr Asn
    530                 535                 540
Leu Tyr Leu Arg Val Ser Ser Ile Gly Asn Ser Thr Ile Arg Val Thr
545                 550                 555                 560
Ile Asn Gly Arg Val Tyr Thr Val Ser Asn Val Asn Thr Thr Thr Asn
                565                 570                 575
Asn Asp Gly Val Asn Asp Asn Gly Ala Arg Phe Ser Asp Ile Asn Ile
            580                 585                 590
Gly Asn Ile Val Ala Ser Asp Asn Thr Asn Val Thr Leu Asp Ile Asn
        595                 600                 605
Val Thr Leu Asn Ser Gly Thr Pro Phe Asp Leu Met Asn Ile Met Phe
    610                 615                 620
Val Pro Thr Asn Leu Pro Pro Leu Tyr
625                 630
```

<210> 10
<211> 652
<212> PRT
<213> Bacillus thuringiensis

<400> 10

```
Met Ile Arg Lys Gly Gly Arg Lys Met Asn Pro Asn Asn Arg Ser Glu
 1               5                  10                  15
His Asp Thr Ile Lys Thr Thr Glu Asn Asn Glu Val Pro Thr Asn His
            20                  25                  30
Val Gln Tyr Pro Leu Ala Glu Thr Pro Asn Pro Thr Leu Glu Asp Leu
        35                  40                  45
Asn Tyr Lys Glu Phe Leu Arg Met Thr Ala Asp Asn Asn Thr Glu Ala
    50                  55                  60
Leu Asp Ser Ser Thr Thr Lys Asp Val Ile Gln Lys Gly Ile Ser Val
65                  70                  75                  80
Val Gly Asp Leu Leu Gly Val Val Gly Phe Pro Phe Gly Gly Ala Leu
                85                  90                  95
Val Ser Phe Tyr Thr Asn Phe Leu Asn Thr Ile Trp Pro Ser Glu Asp
            100                 105                 110
Pro Trp Lys Ala Phe Met Glu Gln Val Glu Ala Leu Met Asp Gln Lys
        115                 120                 125
Ile Ala Asp Tyr Ala Lys Asn Lys Ala Leu Ala Glu Leu Gln Gly Leu
    130                 135                 140
Gln Asn Asn Val Glu Asp Tyr Val Ser Ala Leu Ser Ser Trp Gln Lys
145                 150                 155                 160
Asn Pro Val Ser Ser Arg Asn Pro His Ser Gln Gly Arg Ile Arg Glu
                165                 170                 175
```

```
Leu Phe Ser Gln Ala Glu Ser His Phe Arg Asn Ser Met Pro Ser Phe
            180                 185                 190
Ala Ile Ser Gly Tyr Glu Val Leu Phe Leu Thr Thr Tyr Ala Gln Ala
        195                 200                 205
Ala Asn Thr His Leu Phe Leu Leu Lys Asp Ala Gln Ile Tyr Gly Glu
    210                 215                 220
Glu Trp Gly Tyr Glu Lys Glu Asp Ile Ala Glu Phe Tyr Lys Arg Gln
225                 230                 235                 240
Leu Lys Leu Thr Gln Glu Tyr Thr Asp His Cys Val Lys Trp Tyr Asn
                245                 250                 255
Val Gly Leu Asp Lys Leu Arg Gly Ser Ser Tyr Glu Ser Trp Val Asn
            260                 265                 270
Phe Asn Arg Tyr Arg Arg Glu Met Thr Leu Thr Val Leu Asp Leu Ile
        275                 280                 285
Ala Leu Phe Pro Leu Tyr Asp Val Arg Leu Tyr Pro Lys Glu Val Lys
    290                 295                 300
Thr Glu Leu Thr Arg Asp Val Leu Thr Asp Pro Ile Val Gly Val Asn
305                 310                 315                 320
Asn Leu Arg Gly Tyr Gly Thr Thr Phe Ser Asn Ile Glu Asn Tyr Ile
                325                 330                 335
Arg Lys Pro His Leu Phe Asp Tyr Leu His Arg Ile Gln Phe His Thr
            340                 345                 350
Arg Phe Gln Pro Gly Tyr Tyr Gly Asn Asp Ser Phe Asn Tyr Trp Ser
        355                 360                 365
Gly Asn Tyr Val Ser Thr Arg Pro Ser Ile Gly Ser Asn Asp Ile Ile
    370                 375                 380
Thr Ser Pro Phe Tyr Gly Asn Lys Ser Ser Glu Pro Val Gln Asn Leu
385                 390                 395                 400
Glu Phe Asn Gly Glu Lys Val Tyr Arg Ala Val Ala Asn Thr Asn Leu
                405                 410                 415
Ala Val Trp Pro Ser Ala Val Tyr Ser Gly Val Thr Lys Val Glu Phe
            420                 425                 430
Ser Gln Tyr Asn Asp Gln Thr Asp Glu Ala Ser Thr Gln Thr Tyr Asp
        435                 440                 445
Ser Lys Arg Asn Val Gly Ala Val Ser Trp Asp Ser Ile Asp Gln Leu
    450                 455                 460
Pro Pro Glu Thr Thr Asp Glu Pro Leu Glu Lys Gly Tyr Ser His Gln
465                 470                 475                 480
Leu Asn Tyr Val Met Cys Phe Leu Met Gln Gly Ser Arg Gly Thr Ile
                485                 490                 495
Pro Val Leu Thr Trp Thr His Lys Ser Val Asp Phe Phe Asn Met Ile
            500                 505                 510
Asp Ser Lys Lys Ile Thr Gln Leu Pro Leu Val Lys Ala Tyr Lys Leu
        515                 520                 525
Gln Ser Gly Ala Ser Val Val Ala Gly Pro Arg Phe Thr Gly Gly Asp
    530                 535                 540
Ile Ile Gln Cys Thr Glu Asn Gly Ser Ala Ala Thr Ile Tyr Val Thr
545                 550                 555                 560
Pro Asp Val Ser Tyr Ser Gln Lys Tyr Arg Ala Arg Ile His Tyr Ala
                565                 570                 575
Ser Thr Ser Gln Ile Thr Phe Thr Leu Ser Leu Asp Gly Ala Pro Phe
            580                 585                 590
Asn Gln Tyr Tyr Phe Asp Lys Thr Ile Asn Lys Gly Asp Thr Leu Thr
        595                 600                 605
Tyr Asn Ser Phe Asn Leu Ala Ser Phe Ser Thr Pro Phe Glu Leu Ser
    610                 615                 620
Gly Asn Asn Leu Gln Ile Gly Val Thr Gly Leu Ser Ala Gly Asp Lys
```

625 630 635 640
Val Tyr Ile Asp Lys Ile Glu Phe Ile Pro Val Asn
645 650

<210> 11
<211> 652
<212> PRT
<213> Bacillus thuringiensis

<400> 11
Met Asn Pro Asn Asn Arg Ser Glu His Asp Thr Ile Lys Val Thr Pro
1 5 10 15
Asn Ser Glu Leu Gln Thr Asn His Asn Gln Tyr Pro Leu Ala Asp Asn
20 25 30
Pro Asn Ser Thr Leu Glu Glu Leu Asn Tyr Lys Glu Phe Leu Arg Met
35 40 45
Thr Glu Asp Ser Ser Thr Glu Val Leu Asp Asn Ser Thr Val Lys Asp
50 55 60
Ala Val Gly Thr Gly Ile Ser Val Val Gly Gln Ile Leu Gly Val Val
65 70 75 80
Gly Val Pro Phe Ala Gly Ala Leu Thr Ser Phe Tyr Gln Ser Phe Leu
85 90 95
Asn Thr Ile Trp Pro Ser Asp Ala Asp Pro Trp Lys Ala Phe Met Ala
100 105 110
Gln Val Glu Val Leu Ile Asp Lys Lys Ile Glu Glu Tyr Ala Lys Ser
115 120 125
Lys Ala Leu Ala Glu Leu Gln Gly Leu Gln Asn Asn Phe Glu Asp Tyr
130 135 140
Val Asn Ala Leu Asn Ser Trp Lys Lys Thr Pro Leu Ser Leu Arg Ser
145 150 155 160
Lys Arg Ser Gln Asp Arg Ile Arg Glu Leu Phe Ser Gln Ala Glu Ser
165 170 175
His Phe Arg Asn Ser Met Pro Ser Phe Ala Val Ser Lys Phe Glu Val
180 185 190
Leu Phe Leu Pro Thr Tyr Ala Gln Ala Ala Asn Thr His Leu Leu Leu
195 200 205
Leu Lys Asp Ala Gln Val Phe Gly Glu Glu Trp Gly Tyr Ser Ser Glu
210 215 220
Asp Val Ala Glu Phe Tyr His Arg Gln Leu Lys Leu Thr Gln Gln Tyr
225 230 235 240
Thr Asp His Cys Val Asn Trp Tyr Asn Val Gly Leu Asn Gly Leu Arg
245 250 255
Gly Ser Thr Tyr Asp Ala Trp Val Lys Phe Asn Arg Phe Arg Arg Glu
260 265 270
Met Thr Leu Thr Val Leu Asp Leu Ile Val Leu Phe Pro Phe Tyr Asp
275 280 285
Ile Arg Leu Tyr Ser Lys Gly Val Lys Thr Glu Leu Thr Arg Asp Ile
290 295 300
Phe Thr Asp Pro Ile Phe Ser Leu Asn Thr Leu Gln Glu Tyr Gly Pro
305 310 315 320
Thr Phe Leu Ser Ile Glu Asn Ser Ile Arg Lys Pro His Leu Phe Asp
325 330 335
Tyr Leu Gln Gly Ile Glu Phe His Thr Arg Leu Gln Pro Gly Tyr Phe
340 345 350
Gly Lys Asp Ser Phe Asn Tyr Trp Ser Gly Asn Tyr Val Glu Thr Arg
355 360 365

```
Pro Ser Ile Gly Ser Ser Lys Thr Ile Thr Ser Pro Phe Tyr Gly Asp
    370                 375                 380
Lys Ser Thr Glu Pro Val Gln Lys Leu Ser Phe Asp Gly Gln Lys Val
385                 390                 395                 400
Tyr Arg Thr Ile Ala Asn Thr Asp Val Ala Ala Trp Pro Asn Gly Lys
                405                 410                 415
Val Tyr Leu Gly Val Thr Lys Val Asp Phe Ser Gln Tyr Asp Asp Gln
            420                 425                 430
Lys Asn Glu Thr Ser Thr Gln Thr Tyr Asp Ser Lys Arg Asn Asn Gly
        435                 440                 445
His Val Ser Ala Gln Asp Ser Ile Asp Gln Leu Pro Pro Glu Thr Thr
    450                 455                 460
Asp Glu Pro Leu Glu Lys Ala Tyr Ser His Gln Leu Asn Tyr Ala Glu
465                 470                 475                 480
Cys Phe Leu Met Gln Asp Arg Arg Gly Thr Ile Pro Phe Phe Thr Trp
                485                 490                 495
Thr His Arg Ser Val Asp Phe Phe Asn Thr Ile Asp Ala Glu Lys Ile
            500                 505                 510
Thr Gln Leu Pro Val Val Lys Ala Tyr Ala Leu Ser Ser Gly Ala Ser
        515                 520                 525
Ile Ile Glu Gly Pro Gly Phe Thr Gly Gly Asn Leu Leu Phe Leu Lys
    530                 535                 540
Glu Ser Ser Asn Ser Ile Ala Lys Phe Lys Val Thr Leu Asn Ser Ala
545                 550                 555                 560
Ala Leu Leu Gln Arg Tyr Arg Val Arg Ile Arg Tyr Ala Ser Thr Thr
                565                 570                 575
Asn Leu Arg Leu Phe Val Gln Asn Ser Asn Asn Asp Phe Leu Val Ile
            580                 585                 590
Tyr Ile Asn Lys Thr Met Asn Lys Asp Asp Asp Leu Thr Tyr Gln Thr
        595                 600                 605
Phe Asp Leu Ala Thr Thr Asn Ser Asn Met Gly Phe Ser Gly Asp Lys
    610                 615                 620
Asn Glu Leu Ile Ile Gly Ala Glu Ser Phe Val Ser Asn Glu Lys Ile
625                 630                 635                 640
Tyr Ile Asp Lys Ile Glu Phe Ile Pro Val Gln Leu
                645                 650
```

<210> 12
<211> 1180
<212> PRT
<213> Bacillus thuringiensis

<400> 12

```
Met Asn Pro Tyr Gln Asn Lys Asn Glu Tyr Glu Thr Leu Asn Ala Ser
 1               5                  10                  15
Gln Lys Lys Leu Asn Ile Ser Asn Asn Tyr Thr Arg Tyr Pro Ile Glu
            20                  25                  30
Asn Ser Pro Lys Gln Leu Leu Gln Ser Thr Asn Tyr Lys Asp Trp Leu
        35                  40                  45
Asn Met Cys Gln Gln Asn Gln Gln Tyr Gly Gly Asp Phe Glu Thr Phe
    50                  55                  60
Ile Asp Ser Gly Glu Leu Ser Ala Tyr Thr Ile Val Val Gly Thr Val
65                  70                  75                  80
Leu Thr Gly Phe Gly Phe Thr Thr Pro Leu Gly Leu Ala Leu Ile Gly
                85                  90                  95
Phe Gly Thr Leu Ile Pro Val Leu Phe Pro Ala Gln Asp Gln Ser Asn
```

```
            100                 105                 110
Thr Trp Ser Asp Phe Ile Thr Gln Thr Lys Asn Ile Ile Lys Lys Glu
        115                 120                 125
Ile Ala Ser Thr Tyr Ile Ser Asn Ala Asn Lys Ile Leu Asn Arg Ser
    130                 135                 140
Phe Asn Val Ile Ser Thr Tyr His Asn His Leu Lys Thr Trp Glu Asn
145                 150                 155                 160
Asn Pro Asn Pro Gln Asn Thr Gln Asp Val Arg Thr Gln Ile Gln Leu
                165                 170                 175
Val His Tyr His Phe Gln Asn Val Ile Pro Glu Leu Val Asn Ser Cys
            180                 185                 190
Pro Pro Asn Pro Ser Asp Cys Asp Tyr Tyr Asn Ile Leu Val Leu Ser
        195                 200                 205
Ser Tyr Ala Gln Ala Ala Asn Leu His Leu Thr Val Leu Asn Gln Ala
    210                 215                 220
Val Lys Phe Glu Ala Tyr Leu Lys Asn Asn Arg Gln Phe Asp Tyr Leu
225                 230                 235                 240
Glu Pro Leu Pro Thr Ala Ile Asp Tyr Tyr Pro Val Leu Thr Lys Ala
                245                 250                 255
Ile Glu Asp Tyr Thr Asn Tyr Cys Val Thr Thr Tyr Lys Lys Gly Leu
            260                 265                 270
Asn Leu Ile Lys Thr Thr Pro Asp Ser Asn Leu Asp Gly Asn Ile Asn
        275                 280                 285
Trp Asn Thr Tyr Asn Thr Tyr Arg Thr Lys Met Thr Thr Ala Val Leu
    290                 295                 300
Asp Leu Val Ala Leu Phe Pro Asn Tyr Asp Val Gly Lys Tyr Pro Ile
305                 310                 315                 320
Gly Val Gln Ser Glu Leu Thr Arg Glu Ile Tyr Gln Val Leu Asn Phe
                325                 330                 335
Glu Glu Ser Pro Tyr Lys Tyr Tyr Asp Phe Gln Tyr Gln Glu Asp Ser
            340                 345                 350
Leu Thr Arg Arg Pro His Leu Phe Thr Trp Leu Asp Ser Leu Asn Phe
        355                 360                 365
Tyr Glu Lys Ala Gln Thr Thr Pro Asn Asn Phe Phe Thr Ser His Tyr
    370                 375                 380
Asn Met Phe His Tyr Thr Leu Asp Asn Ile Ser Gln Lys Ser Ser Val
385                 390                 395                 400
Phe Gly Asn His Asn Val Thr Asp Lys Leu Lys Ser Leu Gly Leu Ala
                405                 410                 415
Thr Asn Ile Tyr Ile Phe Leu Leu Asn Val Ile Ser Leu Asp Asn Lys
            420                 425                 430
Tyr Leu Asn Asp Tyr Asn Asn Ile Ser Lys Met Asp Phe Phe Ile Thr
        435                 440                 445
Asn Gly Thr Arg Leu Leu Glu Lys Glu Leu Thr Ala Gly Ser Gly Gln
    450                 455                 460
Ile Thr Tyr Asp Val Asn Lys Asn Ile Phe Gly Leu Pro Ile Leu Lys
465                 470                 475                 480
Arg Arg Glu Asn Gln Gly Asn Pro Thr Leu Phe Pro Thr Tyr Asp Asn
                485                 490                 495
Tyr Ser His Ile Leu Ser Phe Ile Lys Ser Leu Ser Ile Pro Ala Thr
            500                 505                 510
Tyr Lys Thr Gln Val Tyr Thr Phe Ala Trp Thr His Ser Ser Val Asp
        515                 520                 525
Pro Lys Asn Thr Ile Tyr Thr His Leu Thr Thr Gln Ile Pro Ala Val
    530                 535                 540
Lys Ala Asn Ser Leu Gly Thr Ala Ser Lys Val Val Gln Gly Pro Gly
545                 550                 555                 560
```

```
His Thr Gly Gly Asp Leu Ile Asp Phe Lys Asp His Phe Lys Ile Thr
                565                 570                 575
Cys Gln His Ser Asn Phe Gln Gln Ser Tyr Phe Ile Arg Ile Arg Tyr
            580                 585                 590
Ala Ser Asn Gly Ser Ala Asn Thr Arg Ala Val Ile Asn Leu Ser Ile
        595                 600                 605
Pro Gly Val Ala Glu Leu Gly Met Ala Leu Asn Pro Thr Phe Ser Gly
    610                 615                 620
Thr Asp Tyr Thr Asn Leu Lys Tyr Lys Asp Phe Gln Tyr Leu Glu Phe
625                 630                 635                 640
Ser Asn Glu Val Lys Phe Ala Pro Asn Gln Asn Ile Ser Leu Val Phe
                645                 650                 655
Asn Arg Ser Asp Val Tyr Thr Asn Thr Thr Val Leu Ile Asp Lys Ile
            660                 665                 670
Glu Phe Leu Pro Ile Thr Arg Ser Ile Arg Glu Asp Arg Glu Lys Gln
        675                 680                 685
Lys Leu Glu Thr Val Gln Gln Ile Ile Asn Thr Phe Tyr Ala Asn Pro
    690                 695                 700
Ile Lys Asn Thr Leu Gln Ser Glu Leu Thr Asp Tyr Asp Ile Asp Gln
705                 710                 715                 720
Ala Ala Asn Leu Val Glu Cys Ile Ser Glu Glu Leu Tyr Pro Lys Glu
                725                 730                 735
Lys Met Leu Leu Leu Asp Glu Val Lys Asn Ala Lys Gln Leu Ser Gln
            740                 745                 750
Ser Arg Asn Val Leu Gln Asn Gly Asp Phe Glu Ser Ala Thr Leu Gly
        755                 760                 765
Trp Thr Thr Ser Asp Asn Ile Thr Ile Gln Glu Asp Asp Pro Ile Phe
    770                 775                 780
Lys Gly His Tyr Leu His Met Ser Gly Ala Arg Asp Ile Asp Gly Thr
785                 790                 795                 800
Ile Phe Pro Thr Tyr Ile Phe Gln Lys Ile Asp Glu Ser Lys Leu Lys
                805                 810                 815
Pro Tyr Thr Arg Tyr Leu Val Arg Gly Phe Val Gly Ser Ser Lys Asp
            820                 825                 830
Val Glu Leu Val Val Ser Arg Tyr Gly Glu Glu Ile Asp Ala Ile Met
        835                 840                 845
Asn Val Pro Ala Asp Leu Asn Tyr Leu Tyr Pro Ser Thr Phe Asp Cys
    850                 855                 860
Glu Gly Ser Asn Arg Cys Glu Thr Ser Ala Val Pro Ala Asn Ile Gly
865                 870                 875                 880
Asn Thr Ser Asp Met Leu Tyr Ser Cys Gln Tyr Asp Thr Gly Lys Lys
                885                 890                 895
His Val Val Cys Gln Asp Ser His Gln Phe Ser Phe Thr Ile Asp Thr
            900                 905                 910
Gly Ala Leu Asp Thr Asn Glu Asn Ile Gly Val Trp Val Met Phe Lys
        915                 920                 925
Ile Ser Ser Pro Asp Gly Tyr Ala Ser Leu Asp Asn Leu Glu Val Ile
    930                 935                 940
Glu Glu Gly Pro Ile Asp Gly Glu Ala Leu Ser Arg Val Lys His Met
945                 950                 955                 960
Glu Lys Lys Trp Asn Asp Gln Met Glu Ala Lys Arg Ser Glu Thr Gln
                965                 970                 975
Gln Ala Tyr Asp Val Ala Lys Gln Ala Ile Asp Ala Leu Phe Thr Asn
            980                 985                 990
Val Gln Asp Glu Ala Leu Gln Phe Asp Thr Thr Leu Ala Gln Ile Gln
        995                 1000                1005
Tyr Ala Glu Tyr Leu Val Gln Ser Ile Pro Tyr Val Tyr Asn Asp Trp
```

```
    1010                1015                1020
Leu Ser Asp Val Pro Gly Met Asn Tyr Asp Ile Tyr Val Glu Leu Asp
1025                1030                1035                1040
Ala Arg Val Ala Gln Ala Arg Tyr Leu Tyr Asp Thr Arg Asn Ile Ile
                1045                1050                1055
Lys Asn Gly Asp Phe Thr Gln Gly Val Met Gly Trp His Val Thr Gly
            1060                1065                1070
Asn Ala Asp Val Gln Gln Ile Asp Gly Val Ser Val Leu Val Leu Ser
        1075                1080                1085
Asn Trp Ser Ala Gly Val Ser Gln Asn Val His Leu Gln His Asn His
    1090                1095                1100
Gly Tyr Val Leu Arg Val Ile Ala Lys Lys Glu Gly Pro Gly Asn Gly
1105                1110                1115                1120
Tyr Val Thr Leu Met Asp Cys Glu Glu Asn Gln Glu Lys Leu Thr Phe
                1125                1130                1135
Thr Ser Cys Glu Glu Gly Tyr Ile Thr Lys Thr Val Asp Val Phe Pro
            1140                1145                1150
Asp Thr Asp Arg Val Arg Ile Glu Ile Gly Glu Thr Glu Gly Ser Phe
        1155                1160                1165
Tyr Ile Glu Ser Ile Glu Leu Ile Cys Met Asn Glu
    1170                1175                1180


<210> 13
<211> 1136
<212> PRT
<213> Bacillus thuringiensis

<400> 13
Met Asn Ser Gly Tyr Pro Leu Ala Asn Asp Leu Gln Gly Ser Met Lys
 1               5                  10                  15
Asn Thr Asn Tyr Lys Asp Trp Leu Ala Met Cys Glu Asn Asn Gln Gln
            20                  25                  30
Tyr Gly Val Asn Pro Ala Ala Ile Asn Ser Ser Ser Val Ser Thr Ala
        35                  40                  45
Leu Lys Val Ala Gly Ala Ile Leu Lys Phe Val Asn Pro Pro Ala Gly
    50                  55                  60
Thr Val Leu Thr Val Leu Ser Ala Val Leu Pro Ile Leu Trp Pro Thr
65                  70                  75                  80
Asn Thr Pro Thr Pro Glu Arg Val Trp Asn Asp Phe Met Thr Asn Thr
                85                  90                  95
Gly Asn Leu Ile Asp Gln Thr Val Thr Ala Tyr Val Arg Thr Asp Ala
            100                 105                 110
Asn Ala Lys Met Thr Val Val Lys Asp Tyr Leu Asp Gln Tyr Thr Thr
        115                 120                 125
Lys Phe Asn Thr Trp Lys Arg Glu Pro Asn Asn Gln Ser Tyr Arg Thr
    130                 135                 140
Ala Val Ile Thr Gln Phe Asn Leu Thr Ser Ala Lys Leu Arg Glu Thr
145                 150                 155                 160
Ala Val Tyr Phe Ser Asn Leu Val Gly Tyr Glu Leu Leu Leu Leu Pro
                165                 170                 175
Ile Tyr Ala Gln Val Ala Asn Phe Asn Leu Leu Leu Ile Arg Asp Gly
            180                 185                 190
Leu Ile Asn Ala Gln Glu Trp Ser Leu Ala Arg Ser Ala Gly Asp Gln
        195                 200                 205
Leu Tyr Asn Thr Met Val Gln Tyr Thr Lys Glu Tyr Ile Ala His Ser
    210                 215                 220
```

```
Ile Thr Trp Tyr Asn Lys Gly Leu Asp Val Leu Arg Asn Lys Ser Asn
225                 230                 235                 240
Gly Gln Trp Ile Thr Phe Asn Asp Tyr Lys Arg Glu Met Thr Ile Gln
                245                 250                 255
Val Leu Asp Ile Leu Ala Leu Phe Ala Ser Tyr Asp Pro Arg Arg Tyr
            260                 265                 270
Pro Ala Asp Lys Ile Asp Asn Thr Lys Leu Ser Lys Thr Glu Phe Thr
        275                 280                 285
Arg Glu Ile Tyr Thr Ala Leu Val Glu Ser Pro Ser Ser Lys Ser Ile
    290                 295                 300
Ala Ala Leu Glu Ala Ala Leu Thr Arg Asp Val His Leu Phe Thr Trp
305                 310                 315                 320
Leu Lys Arg Val Asp Phe Trp Thr Asn Thr Ile Tyr Gln Asp Leu Arg
                325                 330                 335
Phe Leu Ser Ala Asn Lys Ile Gly Phe Ser Tyr Thr Asn Ser Ser Ala
            340                 345                 350
Met Gln Glu Ser Gly Ile Tyr Gly Ser Ser Gly Phe Gly Ser Asn Leu
        355                 360                 365
Thr His Gln Ile Gln Leu Asn Ser Asn Val Tyr Lys Thr Ser Ile Thr
    370                 375                 380
Asp Thr Ser Ser Pro Ser Asn Arg Val Thr Lys Met Asp Phe Tyr Lys
385                 390                 395                 400
Ile Asp Gly Thr Leu Ala Ser Tyr Asn Ser Asn Ile Thr Pro Thr Pro
                405                 410                 415
Glu Gly Leu Arg Thr Thr Phe Phe Gly Phe Ser Thr Asn Glu Asn Thr
            420                 425                 430
Pro Asn Gln Pro Thr Val Asn Asp Tyr Thr His Ile Leu Ser Tyr Ile
        435                 440                 445
Lys Thr Asp Val Ile Asp Tyr Asn Ser Asn Arg Val Ser Phe Ala Trp
    450                 455                 460
Thr His Lys Ile Val Asp Pro Asn Asn Gln Ile Tyr Thr Asp Ala Ile
465                 470                 475                 480
Thr Gln Val Pro Ala Val Lys Ser Asn Phe Leu Asn Ala Thr Ala Lys
                485                 490                 495
Val Ile Lys Gly Pro Gly His Thr Gly Gly Asp Leu Val Ala Leu Thr
            500                 505                 510
Ser Asn Gly Thr Leu Ser Gly Arg Met Glu Ile Gln Cys Lys Thr Ser
        515                 520                 525
Ile Phe Asn Asp Pro Thr Arg Ser Tyr Gly Leu Arg Ile Arg Tyr Ala
    530                 535                 540
Ala Asn Ser Pro Ile Val Leu Asn Val Ser Tyr Val Leu Gln Gly Val
545                 550                 555                 560
Ser Arg Gly Thr Thr Ile Ser Thr Glu Ser Thr Phe Ser Arg Pro Asn
                565                 570                 575
Asn Ile Ile Pro Thr Asp Leu Lys Tyr Glu Glu Phe Arg Tyr Lys Asp
            580                 585                 590
Pro Phe Asp Ala Ile Val Pro Met Arg Leu Ser Ser Asn Gln Leu Ile
        595                 600                 605
Thr Ile Ala Ile Gln Pro Leu Asn Met Thr Ser Asn Asn Gln Val Ile
    610                 615                 620
Ile Asp Arg Ile Glu Ile Ile Pro Ile Thr Gln Ser Val Leu Asp Glu
625                 630                 635                 640
Thr Glu Asn Gln Asn Leu Glu Ser Glu Arg Glu Val Val Asn Ala Leu
                645                 650                 655
Phe Thr Asn Asp Ala Lys Asp Ala Leu Asn Ile Gly Thr Thr Asp Tyr
            660                 665                 670
Asp Ile Asp Gln Ala Ala Asn Leu Val Glu Cys Ile Ser Glu Glu Leu
```

```
        675                 680                 685
Tyr Pro Lys Glu Lys Met Leu Leu Leu Asp Glu Val Lys Asn Ala Lys
    690                 695                 700
Gln Leu Ser Gln Ser Arg Asn Val Leu Gln Asn Gly Asp Phe Glu Ser
705                 710                 715                 720
Ala Thr Leu Gly Trp Thr Thr Ser Asp Asn Ile Thr Ile Gln Glu Asp
                725                 730                 735
Asp Pro Ile Phe Lys Gly His Tyr Leu His Met Ser Gly Ala Arg Asp
            740                 745                 750
Ile Asp Gly Thr Ile Phe Pro Thr Tyr Ile Phe Gln Lys Ile Asp Glu
        755                 760                 765
Ser Lys Leu Lys Pro Tyr Thr Arg Tyr Leu Val Arg Gly Phe Val Gly
    770                 775                 780
Ser Ser Lys Asp Val Glu Leu Val Val Ser Arg Tyr Gly Glu Glu Ile
785                 790                 795                 800
Asp Ala Ile Met Asn Val Pro Ala Asp Leu Asn Tyr Leu Tyr Pro Ser
                805                 810                 815
Thr Phe Asp Cys Glu Gly Ser Asn Arg Cys Glu Thr Ser Ala Val Pro
            820                 825                 830
Ala Asn Ile Gly Asn Thr Ser Asp Met Leu Tyr Ser Cys Gln Tyr Asp
        835                 840                 845
Thr Gly Lys Lys His Val Val Cys Gln Asp Ser His Gln Phe Ser Phe
    850                 855                 860
Thr Ile Asp Thr Gly Ala Leu Asp Thr Asn Glu Asn Ile Gly Val Trp
865                 870                 875                 880
Val Met Phe Lys Ile Ser Ser Pro Asp Gly Tyr Ala Ser Leu Asp Asn
                885                 890                 895
Leu Glu Val Ile Glu Glu Gly Pro Ile Asp Gly Glu Ala Leu Ser Arg
            900                 905                 910
Val Lys His Met Glu Lys Lys Trp Asn Asp Gln Met Glu Ala Lys Arg
        915                 920                 925
Ser Glu Thr Gln Gln Ala Tyr Asp Val Ala Lys Gln Ala Ile Asp Ala
    930                 935                 940
Leu Phe Thr Asn Val Gln Asp Glu Ala Leu Gln Phe Asp Thr Thr Leu
945                 950                 955                 960
Ala Gln Ile Gln Tyr Ala Glu Tyr Leu Val Gln Ser Ile Pro Tyr Val
                965                 970                 975
Tyr Asn Asp Trp Leu Ser Asp Val Pro Gly Met Asn Tyr Asp Ile Tyr
            980                 985                 990
Val Glu Leu Asp Ala Arg Val Ala Gln Ala Arg Tyr Leu Tyr Asp Thr
        995                 1000                1005
Arg Asn Ile Ile Lys Asn Gly Asp Phe Thr Gln Gly Val Met Gly Trp
    1010                1015                1020
His Val Thr Gly Asn Ala Asp Val Gln Gln Ile Asp Gly Val Ser Val
1025                1030                1035                1040
Leu Val Leu Ser Asn Trp Ser Ala Gly Val Ser Gln Asn Val His Leu
                1045                1050                1055
Gln His Asn His Gly Tyr Val Leu Arg Val Ile Ala Lys Lys Glu Gly
            1060                1065                1070
Pro Gly Asn Gly Tyr Val Thr Leu Met Asp Cys Glu Glu Asn Gln Glu
        1075                1080                1085
Lys Leu Thr Phe Thr Ser Cys Glu Glu Gly Tyr Ile Thr Lys Thr Val
    1090                1095                1100
Asp Val Phe Pro Asp Thr Asp Arg Val Arg Ile Glu Ile Gly Glu Thr
1105                1110                1115                1120
Glu Gly Ser Phe Tyr Ile Glu Ser Ile Glu Leu Ile Cys Met Asn Glu
                1125                1130                1135
```

<210> 14
<211> 475
<212> PRT
<213> Bacillus thuringiensis

<400> 14
Met Ile Ile Asp Ser Lys Thr Thr Leu Pro Arg His Ser Leu Ile His
 1   5   10   15
Thr Ile Lys Leu Asn Ser Asn Lys Lys Tyr Gly Pro Gly Asp Met Thr
            20   25   30
Asn Gly Asn Gln Phe Ile Ile Ser Lys Gln Glu Trp Ala Thr Ile Gly
        35   40   45
Ala Tyr Ile Gln Thr Gly Leu Gly Leu Pro Val Asn Glu Gln Gln Leu
    50   55   60
Arg Thr His Val Asn Leu Ser Gln Asp Ile Ser Ile Pro Ser Asp Phe
65   70   75   80
Ser Gln Leu Tyr Asp Val Tyr Cys Ser Asp Lys Thr Ser Ala Glu Trp
                85   90   95
Trp Asn Lys Asn Leu Tyr Pro Leu Ile Ile Lys Ser Ala Asn Asp Ile
            100   105   110
Ala Ser Tyr Gly Phe Lys Val Ala Gly Asp Pro Ser Ile Lys Lys Asp
        115   120   125
Gly Tyr Phe Lys Lys Leu Gln Asp Glu Leu Asp Asn Ile Val Asp Asn
    130   135   140
Asn Ser Asp Asp Asp Ala Ile Ala Lys Ala Ile Lys Asp Phe Lys Ala
145   150   155   160
Arg Cys Gly Ile Leu Ile Lys Glu Ala Lys Gln Tyr Glu Glu Ala Ala
                165   170   175
Lys Asn Ile Val Thr Ser Leu Asp Gln Phe Leu His Gly Asp Gln Lys
            180   185   190
Lys Leu Glu Gly Val Ile Asn Ile Gln Lys Arg Leu Lys Glu Val Gln
        195   200   205
Thr Ala Leu Asn Gln Ala His Gly Glu Ser Ser Pro Ala His Lys Glu
    210   215   220
Leu Leu Glu Lys Val Lys Asn Leu Lys Thr Thr Leu Glu Arg Thr Ile
225   230   235   240
Lys Ala Glu Gln Asp Leu Glu Lys Lys Val Glu Tyr Ser Phe Leu Leu
                245   250   255
Gly Pro Leu Leu Gly Phe Val Val Tyr Glu Ile Leu Glu Asn Thr Ala
            260   265   270
Val Gln His Ile Lys Asn Gln Ile Asp Glu Ile Lys Lys Gln Leu Asp
        275   280   285
Ser Ala Gln His Asp Leu Asp Arg Asp Val Lys Ile Ile Gly Met Leu
    290   295   300
Asn Ser Ile Asn Thr Asp Ile Asp Asn Leu Tyr Ser Gln Gly Gln Glu
305   310   315   320
Ala Ile Lys Val Phe Gln Lys Leu Gln Gly Ile Trp Ala Thr Ile Gly
                325   330   335
Ala Gln Ile Glu Asn Leu Arg Thr Thr Ser Leu Gln Glu Val Gln Asp
            340   345   350
Ser Asp Asp Ala Asp Glu Ile Gln Ile Glu Leu Glu Asp Ala Ser Asp
        355   360   365
Ala Trp Leu Val Val Ala Gln Glu Ala Arg Asp Phe Thr Leu Asn Ala
    370   375   380
Tyr Ser Thr Asn Ser Arg Gln Asn Leu Pro Ile Asn Val Ile Ser Asp

385 390 395 400
Ser Cys Asn Cys Ser Thr Thr Asn Met Thr Ser Asn Gln Tyr Ser Asn
405 410 415
Pro Thr Thr Asn Met Thr Ser Asn Gln Tyr Met Ile Ser His Glu Tyr
420 425 430
Thr Ser Leu Pro Asn Asn Phe Met Leu Ser Arg Asn Ser Asn Leu Glu
435 440 445
Tyr Lys Cys Pro Glu Asn Asn Phe Met Ile Tyr Trp Tyr Asn Asn Ser
450 455 460
Asp Trp Tyr Asn Asn Ser Asp Trp Tyr Asn Asn
465 470 475

<210> 15
<211> 1138
<212> PRT
<213> Bacillus thuringiensis

<400> 15
Met Asn Leu Asn Asn Leu Asp Gly Tyr Glu Asp Ser Asn Arg Thr Leu
1 5 10 15
Asn Asn Ser Leu Asn Tyr Pro Thr Gln Lys Ala Leu Ser Pro Ser Leu
20 25 30
Lys Asn Met Asn Tyr Gln Asp Phe Leu Ser Ile Thr Glu Arg Glu Gln
35 40 45
Pro Glu Ala Leu Ala Ser Gly Asn Thr Ala Ile Asn Thr Val Val Ser
50 55 60
Val Thr Gly Ala Thr Leu Ser Ala Leu Gly Val Pro Gly Ala Ser Phe
65 70 75 80
Ile Thr Asn Phe Tyr Leu Lys Ile Ala Gly Leu Leu Trp Pro Glu Asn
85 90 95
Gly Lys Ile Trp Asp Glu Phe Met Thr Glu Val Glu Ala Leu Ile Asp
100 105 110
Gln Lys Ile Glu Glu Tyr Val Arg Asn Lys Ala Ile Ala Glu Leu Asp
115 120 125
Gly Leu Gly Ser Ala Leu Asp Lys Tyr Gln Lys Ala Leu Ala Asp Trp
130 135 140
Leu Gly Lys Gln Asp Asp Pro Glu Ala Ile Leu Ser Val Ala Thr Glu
145 150 155 160
Phe Arg Ile Ile Asp Ser Leu Phe Glu Phe Ser Met Pro Ser Phe Lys
165 170 175
Val Thr Gly Tyr Glu Ile Pro Leu Leu Thr Val Tyr Ala Gln Ala Ala
180 185 190
Asn Leu His Leu Ala Leu Leu Arg Asp Ser Thr Leu Tyr Gly Asp Lys
195 200 205
Trp Gly Phe Thr Gln Asn Asn Ile Glu Glu Asn Tyr Asn Arg Gln Lys
210 215 220
Lys Arg Ile Ser Glu Tyr Ser Asp His Cys Thr Lys Trp Tyr Asn Ser
225 230 235 240
Gly Leu Ser Arg Leu Asn Gly Ser Thr Tyr Glu Gln Trp Ile Asn Tyr
245 250 255
Asn Arg Phe Arg Arg Glu Met Ile Leu Met Ala Leu Asp Leu Val Ala
260 265 270
Val Phe Pro Phe His Asp Pro Arg Arg Tyr Ser Met Glu Thr Ser Thr
275 280 285
Gln Leu Thr Arg Glu Val Tyr Thr Asp Pro Val Ser Leu Ser Ile Ser
290 295 300

```
Asn Pro Asp Ile Gly Pro Ser Phe Ser Gln Met Glu Asn Thr Ala Ile
305                 310                 315                 320
Arg Thr Pro His Leu Val Asp Tyr Leu Asp Glu Leu Tyr Ile Tyr Thr
                325                 330                 335
Ser Lys Tyr Lys Ala Phe Ser His Glu Ile Gln Pro Asp Leu Phe Tyr
            340                 345                 350
Trp Ser Ala His Lys Val Ser Phe Lys Lys Ser Glu Gln Ser Asn Leu
        355                 360                 365
Tyr Thr Thr Gly Ile Tyr Gly Lys Thr Ser Gly Tyr Ile Ser Ser Gly
    370                 375                 380
Ala Tyr Ser Phe His Gly Asn Asp Ile Tyr Arg Thr Leu Ala Ala Pro
385                 390                 395                 400
Ser Val Val Val Tyr Pro Tyr Thr Gln Asn Tyr Gly Val Glu Gln Val
                405                 410                 415
Glu Phe Tyr Gly Val Lys Gly His Val His Tyr Arg Gly Asp Asn Lys
            420                 425                 430
Tyr Asp Leu Thr Tyr Asp Ser Ile Asp Gln Leu Pro Pro Asp Gly Glu
        435                 440                 445
Pro Ile His Glu Lys Tyr Thr His Arg Leu Cys His Ala Thr Ala Ile
    450                 455                 460
Phe Lys Ser Thr Pro Asp Tyr Asp Asn Ala Thr Ile Pro Ile Phe Ser
465                 470                 475                 480
Trp Thr His Arg Ser Ala Glu Tyr Tyr Asn Arg Ile Tyr Pro Asn Lys
                485                 490                 495
Ile Thr Lys Ile Pro Ala Val Lys Met Tyr Lys Leu Asp Asp Pro Ser
            500                 505                 510
Thr Val Val Lys Gly Pro Gly Phe Thr Gly Gly Asp Leu Val Lys Arg
        515                 520                 525
Gly Ser Thr Gly Tyr Ile Gly Asp Ile Lys Ala Thr Val Asn Ser Pro
    530                 535                 540
Leu Ser Gln Lys Tyr Arg Val Arg Val Arg Tyr Ala Thr Asn Val Ser
545                 550                 555                 560
Gly Gln Phe Asn Val Tyr Ile Asn Asp Lys Ile Thr Leu Gln Thr Lys
                565                 570                 575
Phe Gln Asn Thr Val Glu Thr Ile Gly Glu Gly Lys Asp Leu Thr Tyr
            580                 585                 590
Gly Ser Phe Gly Tyr Ile Glu Tyr Ser Thr Thr Ile Gln Phe Pro Asp
        595                 600                 605
Glu His Pro Lys Ile Thr Leu His Leu Ser Asp Leu Ser Asn Asn Ser
    610                 615                 620
Ser Phe Tyr Val Asp Ser Ile Glu Phe Ile Pro Val Asp Val Asn Tyr
625                 630                 635                 640
Ala Glu Lys Glu Lys Leu Glu Lys Ala Gln Lys Ala Val Asn Thr Leu
                645                 650                 655
Phe Thr Glu Gly Arg Asn Ala Leu Gln Lys Asp Val Thr Asp Tyr Lys
            660                 665                 670
Val Asp Gln Val Ser Ile Leu Val Asp Cys Ile Ser Gly Asp Leu Tyr
        675                 680                 685
Pro Asn Glu Lys Arg Glu Leu Gln Asn Leu Val Lys Tyr Ala Lys Arg
    690                 695                 700
Leu Ser Tyr Ser Arg Asn Leu Leu Leu Asp Pro Thr Phe Asp Ser Ile
705                 710                 715                 720
Asn Ser Ser Glu Glu Asn Gly Trp Tyr Gly Ser Asn Gly Ile Val Ile
                725                 730                 735
Gly Asn Gly Asp Phe Val Phe Lys Gly Asn Tyr Leu Ile Phe Ser Gly
            740                 745                 750
Thr Asn Asp Thr Gln Tyr Pro Thr Tyr Leu Tyr Gln Lys Ile Asp Glu
```

```
        755                 760                 765
Ser Lys Leu Lys Glu Tyr Thr Arg Tyr Lys Leu Lys Gly Phe Ile Glu
    770                 775                 780
Ser Ser Gln Asp Leu Glu Ala Tyr Val Ile Arg Tyr Asp Ala Lys His
785                 790                 795                 800
Arg Thr Leu Asp Val Ser Asp Asn Leu Leu Pro Asp Ile Leu Pro Glu
                805                 810                 815
Asn Thr Cys Gly Glu Pro Asn Arg Cys Ala Ala Gln Gln Tyr Leu Asp
            820                 825                 830
Glu Asn Pro Ser Pro Glu Cys Ser Ser Met Gln Asp Gly Ile Leu Ser
        835                 840                 845
Asp Ser His Ser Phe Ser Leu Asn Ile Asp Thr Gly Ser Ile Asn His
    850                 855                 860
Asn Glu Asn Leu Gly Ile Trp Val Leu Phe Lys Ile Ser Thr Leu Glu
865                 870                 875                 880
Gly Tyr Ala Lys Phe Gly Asn Leu Glu Val Ile Glu Asp Gly Pro Val
                885                 890                 895
Ile Gly Glu Ala Leu Ala Arg Val Lys Arg Gln Glu Thr Lys Trp Arg
            900                 905                 910
Asn Lys Leu Ala Gln Leu Thr Thr Glu Thr Gln Ala Ile Tyr Thr Arg
        915                 920                 925
Ala Lys Gln Ala Leu Asp Asn Leu Phe Ala Asn Ala Gln Asp Ser His
    930                 935                 940
Leu Lys Arg Asp Val Thr Phe Ala Glu Ile Ala Ala Ala Arg Lys Ile
945                 950                 955                 960
Val Gln Ser Ile Arg Glu Ala Tyr Met Ser Trp Leu Ser Val Val Pro
                965                 970                 975
Gly Val Asn His Pro Ile Phe Thr Glu Leu Ser Gly Arg Val Gln Arg
            980                 985                 990
Ala Phe Gln Leu Tyr Asp Val Arg Asn Val Val Arg Asn Gly Arg Phe
        995                 1000                1005
Leu Asn Gly Leu Ser Asp Trp Ile Val Thr Ser Asp Val Lys Val Gln
    1010                1015                1020
Glu Glu Asn Gly Asn Asn Val Leu Val Leu Asn Asn Trp Asp Ala Gln
1025                1030                1035                1040
Val Leu Gln Asn Val Lys Leu Tyr Gln Asp Arg Gly Tyr Ile Leu His
                1045                1050                1055
Val Thr Ala Arg Lys Ile Gly Ile Gly Glu Gly Tyr Ile Thr Ile Thr
            1060                1065                1070
Asp Glu Glu Gly His Thr Asp Gln Leu Arg Phe Thr Ala Cys Glu Glu
        1075                1080                1085
Ile Asp Ala Ser Asn Ala Phe Ile Ser Gly Tyr Ile Thr Lys Glu Leu
    1090                1095                1100
Glu Phe Phe Pro Asp Thr Glu Lys Val His Ile Glu Ile Gly Glu Thr
1105                1110                1115                1120
Glu Gly Ile Phe Leu Val Glu Ser Ile Glu Leu Phe Leu Met Glu Glu
                1125                1130                1135
Leu Cys
```

<210> 16
<211> 1157
<212> PRT
<213> Bacillus thuringiensis

<400> 16

```
Met Ser Pro Asn Asn Gln Asn Glu Tyr Glu Ile Ile Asp Ala Thr Pro
 1               5                  10                  15
Ser Thr Ser Val Ser Ser Asp Ser Asn Arg Tyr Pro Phe Ala Asn Glu
            20                  25                  30
Pro Thr Asp Ala Leu Gln Asn Met Asn Tyr Lys Asp Tyr Leu Lys Met
        35                  40                  45
Ser Gly Gly Glu Asn Pro Glu Leu Phe Gly Asn Pro Glu Thr Phe Ile
    50                  55                  60
Ser Ser Ser Thr Ile Gln Thr Gly Ile Gly Ile Val Gly Arg Ile Leu
65                  70                  75                  80
Gly Ala Leu Gly Val Pro Phe Ala Ser Gln Ile Ala Ser Phe Tyr Ser
                85                  90                  95
Phe Ile Val Gly Gln Leu Trp Pro Ser Lys Ser Val Asp Ile Trp Gly
            100                 105                 110
Glu Ile Met Glu Arg Val Glu Glu Leu Val Asp Gln Lys Ile Glu Lys
        115                 120                 125
Tyr Val Lys Asp Lys Ala Leu Ala Glu Leu Lys Gly Leu Gly Asn Ala
    130                 135                 140
Leu Asp Val Tyr Gln Gln Ser Leu Glu Asp Trp Leu Glu Asn Arg Asn
145                 150                 155                 160
Asp Ala Arg Thr Arg Ser Val Val Ser Asn Gln Phe Ile Ala Leu Asp
                165                 170                 175
Leu Asn Phe Val Ser Ser Ile Pro Ser Phe Ala Val Ser Gly His Glu
            180                 185                 190
Val Leu Leu Leu Ala Val Tyr Ala Gln Ala Val Asn Leu His Leu Leu
        195                 200                 205
Leu Leu Arg Asp Ala Ser Ile Phe Gly Glu Glu Trp Gly Phe Thr Pro
    210                 215                 220
Gly Glu Ile Ser Arg Phe Tyr Asn Arg Gln Val Gln Leu Thr Ala Glu
225                 230                 235                 240
Tyr Ser Asp Tyr Cys Val Lys Trp Tyr Lys Ile Gly Leu Asp Lys Leu
                245                 250                 255
Lys Gly Thr Thr Ser Lys Ser Trp Leu Asn Tyr His Gln Phe Arg Arg
            260                 265                 270
Glu Met Thr Leu Leu Val Leu Asp Leu Val Ala Leu Phe Pro Asn Tyr
        275                 280                 285
Asp Thr His Met Tyr Pro Ile Glu Thr Thr Ala Gln Leu Thr Arg Asp
    290                 295                 300
Val Tyr Thr Asp Pro Ile Ala Phe Asn Ile Val Thr Ser Thr Gly Phe
305                 310                 315                 320
Cys Asn Pro Trp Ser Thr His Ser Gly Ile Leu Phe Tyr Glu Val Glu
                325                 330                 335
Asn Asn Val Ile Arg Pro Pro His Leu Phe Asp Ile Leu Ser Ser Val
            340                 345                 350
Glu Ile Asn Thr Ser Arg Gly Gly Ile Thr Leu Asn Asn Asp Ala Tyr
        355                 360                 365
Ile Asn Tyr Trp Ser Gly His Thr Leu Lys Tyr Arg Arg Thr Ala Asp
    370                 375                 380
Ser Thr Val Thr Tyr Thr Ala Asn Tyr Gly Arg Ile Thr Ser Glu Lys
385                 390                 395                 400
Asn Ser Phe Ala Leu Glu Asp Arg Asp Ile Phe Glu Ile Asn Ser Thr
                405                 410                 415
Val Ala Asn Leu Ala Asn Tyr Tyr Gln Lys Ala Tyr Gly Val Pro Gly
            420                 425                 430
Ser Trp Phe His Met Val Lys Arg Gly Thr Ser Ser Thr Thr Ala Tyr
        435                 440                 445
Leu Tyr Ser Lys Thr His Thr Ala Leu Gln Gly Cys Thr Gln Val Tyr
```

```
    450                 455                 460
Glu Ser Ser Asp Glu Ile Pro Leu Asp Arg Thr Val Pro Val Ala Glu
465                 470                 475                 480
Ser Tyr Ser His Arg Leu Ser His Ile Thr Ser His Ser Phe Ser Lys
                485                 490                 495
Asn Gly Ser Ala Tyr Tyr Gly Ser Phe Pro Val Phe Val Trp Thr His
            500                 505                 510
Thr Ser Ala Asp Leu Asn Asn Thr Ile Tyr Ser Asp Lys Ile Thr Gln
        515                 520                 525
Ile Pro Ala Val Lys Gly Asp Met Leu Tyr Leu Gly Gly Ser Val Val
    530                 535                 540
Gln Gly Pro Gly Phe Thr Gly Gly Asp Ile Leu Lys Arg Thr Asn Pro
545                 550                 555                 560
Ser Ile Leu Gly Thr Phe Ala Val Thr Val Asn Gly Ser Leu Ser Gln
                565                 570                 575
Arg Tyr Arg Val Arg Ile Arg Tyr Ala Ser Thr Thr Asp Phe Glu Phe
            580                 585                 590
Thr Leu Tyr Leu Gly Asp Thr Ile Glu Lys Asn Arg Phe Asn Lys Thr
        595                 600                 605
Met Asp Asn Gly Ala Ser Leu Thr Tyr Glu Thr Phe Lys Phe Ala Ser
    610                 615                 620
Phe Ile Thr Asp Phe Gln Phe Arg Glu Thr Gln Asp Lys Ile Leu Leu
625                 630                 635                 640
Ser Met Gly Asp Phe Ser Ser Gly Gln Glu Val Tyr Ile Asp Arg Ile
                645                 650                 655
Glu Phe Ile Pro Val Asp Glu Thr Tyr Glu Ala Glu Gln Asp Leu Glu
            660                 665                 670
Ala Ala Lys Lys Ala Val Asn Ala Leu Phe Thr Asn Thr Lys Asp Gly
        675                 680                 685
Leu Arg Pro Gly Val Thr Asp Tyr Glu Val Asn Gln Ala Ala Asn Leu
    690                 695                 700
Val Glu Cys Leu Ser Asp Asp Leu Tyr Pro Asn Glu Lys Arg Leu Leu
705                 710                 715                 720
Phe Asp Ala Val Arg Glu Ala Lys Arg Leu Ser Gly Ala Arg Asn Leu
                725                 730                 735
Leu Gln Asp Pro Asp Phe Gln Glu Ile Asn Gly Glu Asn Gly Trp Ala
            740                 745                 750
Ala Ser Thr Gly Ile Glu Ile Val Glu Gly Asp Ala Val Phe Lys Gly
        755                 760                 765
Arg Tyr Leu Arg Leu Pro Gly Ala Arg Glu Ile Asp Thr Glu Thr Tyr
    770                 775                 780
Pro Thr Tyr Leu Tyr Gln Lys Val Glu Glu Gly Val Leu Lys Pro Tyr
785                 790                 795                 800
Thr Arg Tyr Arg Leu Arg Gly Phe Val Gly Ser Ser Gln Gly Leu Glu
                805                 810                 815
Ile Tyr Thr Ile Arg His Gln Thr Asn Arg Ile Val Lys Asn Val Pro
            820                 825                 830
Asp Asp Leu Leu Pro Asp Val Ser Pro Val Asn Ser Asp Gly Ser Ile
        835                 840                 845
Asn Arg Cys Ser Glu Gln Lys Tyr Val Asn Ser Arg Leu Glu Gly Glu
    850                 855                 860
Asn Arg Ser Gly Asp Ala His Glu Phe Ser Leu Pro Ile Asp Ile Gly
865                 870                 875                 880
Glu Leu Asp Tyr Asn Glu Asn Ala Gly Ile Trp Val Gly Phe Lys Ile
                885                 890                 895
Thr Asp Pro Glu Gly Tyr Ala Thr Leu Gly Asn Leu Glu Leu Val Glu
            900                 905                 910
```

```
Glu Gly Pro Leu Ser Gly Asp Ala Leu Glu Arg Leu Gln Arg Glu Glu
        915                 920                 925
Gln Gln Trp Lys Ile Gln Met Thr Arg Arg Arg Glu Glu Thr Asp Arg
    930                 935                 940
Arg Tyr Met Ala Ser Lys Gln Ala Val Asp Arg Leu Tyr Ala Asp Tyr
945                 950                 955                 960
Gln Asp Gln Gln Leu Asn Pro Asp Val Glu Ile Thr Asp Leu Thr Ala
                965                 970                 975
Ala Gln Asp Leu Ile Gln Ser Ile Pro Tyr Val Tyr Asn Glu Met Phe
            980                 985                 990
Pro Glu Ile Pro Gly Met Asn Tyr Thr Lys Phe Thr Glu Leu Thr Asp
        995                 1000                1005
Arg Leu Gln Gln Ala Trp Asn Leu Tyr Asp Gln Arg Asn Ala Ile Pro
    1010                1015                1020
Asn Gly Asp Phe Arg Asn Gly Leu Ser Asn Trp Asn Ala Thr Pro Gly
1025                1030                1035                1040
Val Glu Val Gln Gln Ile Asn His Thr Ser Val Leu Val Ile Pro Asn
                1045                1050                1055
Trp Asp Glu Gln Val Ser Gln Gln Phe Thr Val Gln Pro Asn Gln Arg
            1060                1065                1070
Tyr Val Leu Arg Val Thr Ala Arg Lys Glu Gly Val Gly Asn Gly Tyr
        1075                1080                1085
Val Ser Ile Arg Asp Gly Gly Asn Gln Ser Glu Thr Leu Thr Phe Ser
    1090                1095                1100
Ala Ser Asp Tyr Asp Thr Asn Gly Val Tyr Asn Asp Gln Thr Gly Tyr
1105                1110                1115                1120
Ile Thr Lys Thr Val Thr Phe Ile Pro Tyr Thr Asp Gln Met Trp Ile
                1125                1130                1135
Glu Ile Ser Glu Thr Glu Gly Thr Phe Tyr Ile Glu Ser Val Glu Leu
            1140                1145                1150
Ile Val Asp Val Glu
        1155
```

<210> 17
<211> 675
<212> PRT
<213> Bacillus thuringiensis

<400> 17

```
Met Asn Pro Tyr Gln Asn Lys Asn Glu Tyr Glu Ile Phe Asn Ala Pro
 1               5                  10                  15
Ser Asn Gly Phe Ser Lys Ser Asn Asn Tyr Ser Arg Tyr Pro Leu Ala
            20                  25                  30
Asn Lys Pro Asn Gln Pro Leu Lys Asn Thr Asn Tyr Lys Asp Trp Leu
        35                  40                  45
Asn Val Cys Gln Asp Asn Gln Gln Tyr Gly Asn Asn Ala Gly Asn Phe
    50                  55                  60
Ala Ser Ser Glu Thr Ile Val Gly Val Ser Ala Gly Ile Ile Val Val
65                  70                  75                  80
Gly Thr Met Leu Gly Ala Phe Ala Ala Pro Val Leu Ala Ala Gly Ile
                85                  90                  95
Ile Ser Phe Gly Thr Leu Leu Pro Ile Phe Trp Gln Gly Ser Asp Pro
            100                 105                 110
Ala Asn Val Trp Gln Asp Leu Leu Asn Ile Gly Gly Arg Pro Ile Gln
        115                 120                 125
Glu Ile Asp Lys Asn Ile Ile Asn Val Leu Thr Ser Ile Val Thr Pro
```

```
    130                 135                 140
Ile Lys Asn Gln Leu Asp Lys Tyr Gln Glu Phe Phe Asp Lys Trp Glu
145                 150                 155                 160
Pro Ala Arg Thr His Ala Asn Ala Lys Ala Val His Asp Leu Phe Thr
                165                 170                 175
Thr Leu Glu Pro Ile Ile Asp Lys Asp Leu Asp Met Leu Lys Asn Asn
            180                 185                 190
Ala Ser Tyr Arg Ile Pro Thr Leu Pro Ala Tyr Ala Gln Ile Ala Thr
        195                 200                 205
Trp His Leu Asn Leu Leu Lys His Ala Ala Thr Tyr Tyr Asn Ile Trp
    210                 215                 220
Leu Gln Asn Gln Gly Ile Asn Pro Ser Thr Phe Asn Ser Ser Asn Tyr
225                 230                 235                 240
Tyr Gln Gly Tyr Leu Lys Arg Lys Ile Gln Glu Tyr Thr Asp Tyr Cys
                245                 250                 255
Ile Gln Thr Tyr Asn Ala Gly Leu Thr Met Ile Arg Thr Asn Thr Asn
            260                 265                 270
Ala Thr Trp Asn Met Tyr Asn Thr Tyr Arg Leu Glu Met Thr Leu Thr
        275                 280                 285
Val Leu Asp Leu Ile Ala Ile Phe Pro Asn Tyr Asp Pro Glu Lys Tyr
    290                 295                 300
Pro Ile Gly Val Lys Ser Glu Leu Ile Arg Glu Val Tyr Thr Asn Val
305                 310                 315                 320
Asn Ser Asp Thr Phe Arg Thr Ile Thr Glu Leu Glu Asn Gly Leu Thr
                325                 330                 335
Arg Asn Pro Thr Leu Phe Thr Trp Ile Asn Gln Gly Arg Phe Tyr Thr
            340                 345                 350
Arg Asn Ser Arg Asp Ile Leu Asp Pro Tyr Asp Ile Phe Ser Phe Thr
        355                 360                 365
Gly Asn Gln Met Ala Phe Thr His Thr Asn Asp Asp Arg Asn Ile Ile
    370                 375                 380
Trp Gly Ala Val His Gly Asn Ile Ile Ser Gln Asp Thr Ser Lys Val
385                 390                 395                 400
Phe Pro Phe Tyr Arg Asn Lys Pro Ile Asp Lys Val Glu Ile Val Arg
                405                 410                 415
His Arg Glu Tyr Ser Asp Ile Ile Tyr Glu Met Ile Phe Phe Ser Asn
            420                 425                 430
Ser Ser Glu Val Phe Arg Tyr Ser Ser Asn Ser Thr Ile Glu Asn Asn
        435                 440                 445
Tyr Lys Arg Thr Asp Ser Tyr Met Ile Pro Lys Gln Thr Trp Lys Asn
    450                 455                 460
Glu Glu Tyr Gly His Thr Leu Ser Tyr Ile Lys Thr Asp Asn Tyr Ile
465                 470                 475                 480
Phe Ser Val Val Arg Glu Arg Arg Arg Val Ala Phe Ser Trp Thr His
                485                 490                 495
Thr Ser Val Asp Phe Gln Asn Thr Ile Asp Leu Asp Asn Ile Thr Gln
            500                 505                 510
Ile His Ala Leu Lys Ala Leu Lys Val Ser Ser Asp Ser Lys Ile Val
        515                 520                 525
Lys Gly Pro Gly His Thr Gly Gly Asp Leu Val Ile Leu Lys Asp Ser
    530                 535                 540
Met Asp Phe Arg Val Arg Phe Leu Lys Asn Val Ser Arg Gln Tyr Gln
545                 550                 555                 560
Val Arg Ile Arg Tyr Ala Thr Asn Ala Pro Lys Thr Thr Val Phe Leu
                565                 570                 575
Thr Gly Ile Asp Thr Ile Ser Val Glu Leu Pro Ser Thr Thr Ser Arg
            580                 585                 590
```

```
Gln Asn Pro Asn Ala Thr Asp Leu Thr Tyr Ala Asp Phe Gly Tyr Val
        595                 600                 605
Thr Phe Pro Arg Thr Val Pro Asn Lys Thr Phe Glu Gly Glu Asp Thr
    610                 615                 620
Leu Leu Met Thr Leu Tyr Gly Thr Pro Asn His Ser Tyr Asn Ile Tyr
625                 630                 635                 640
Ile Asp Lys Ile Glu Phe Ile Pro Ile Thr Gln Ser Val Leu Asp Tyr
                645                 650                 655
Thr Glu Lys Gln Asn Ile Glu Lys Thr Gln Lys Ile Val Asn Asp Leu
            660                 665                 670
Phe Val Asn
        675
```

<210> 18
<211> 648
<212> PRT
<213> Bacillus thuringiensis

<400> 18

```
Met His Tyr Tyr Gly Asn Arg Asn Glu Tyr Asp Ile Leu Asn Ala Ser
 1               5                  10                  15
Ser Asn Asp Ser Asn Met Ser Asn Thr Tyr Pro Arg Tyr Pro Leu Ala
            20                  25                  30
Asn Pro Gln Gln Asp Leu Met Gln Asn Thr Asn Tyr Lys Asp Trp Leu
        35                  40                  45
Asn Val Cys Glu Gly Tyr His Ile Glu Asn Pro Arg Glu Ala Ser Val
    50                  55                  60
Arg Ala Gly Leu Gly Lys Gly Leu Gly Ile Val Ser Thr Ile Val Gly
65                  70                  75                  80
Phe Phe Gly Gly Ser Ile Ile Leu Asp Thr Ile Gly Leu Phe Tyr Gln
                85                  90                  95
Ile Ser Glu Leu Leu Trp Pro Glu Asp Asp Thr Gln Gln Tyr Thr Trp
            100                 105                 110
Gln Asp Ile Met Asn His Val Glu Asp Leu Ile Asp Lys Arg Ile Thr
        115                 120                 125
Glu Val Ile Arg Gly Asn Ala Ile Arg Thr Leu Ala Asp Leu Gln Gly
    130                 135                 140
Lys Val Asp Asp Tyr Asn Asn Trp Leu Lys Lys Trp Lys Asp Asp Pro
145                 150                 155                 160
Lys Ser Thr Gly Asn Leu Ser Thr Leu Val Thr Lys Phe Thr Ala Leu
                165                 170                 175
Asp Ser Asp Phe Asn Gly Ala Ile Arg Thr Val Asn Asn Gln Gly Ser
            180                 185                 190
Pro Gly Tyr Glu Leu Leu Leu Leu Pro Val Tyr Ala Gln Ile Ala Asn
        195                 200                 205
Leu His Leu Leu Leu Leu Arg Asp Ala Gln Ile Tyr Gly Asp Lys Trp
    210                 215                 220
Trp Ser Ala Arg Ala Asn Ala Arg Asp Asn Tyr Tyr Gln Ile Gln Leu
225                 230                 235                 240
Glu Lys Thr Lys Glu Tyr Thr Glu Tyr Cys Ile Asn Trp Tyr Asn Lys
                245                 250                 255
Gly Leu Asn Asp Phe Arg Thr Ala Gly Gln Trp Val Asn Phe Asn Arg
            260                 265                 270
Tyr Arg Arg Glu Met Thr Leu Thr Val Leu Asp Ile Ile Ser Met Phe
        275                 280                 285
Pro Ile Tyr Asp Ala Arg Leu Tyr Pro Thr Glu Val Lys Thr Glu Leu
```

```
    290                 295                 300
Thr Arg Glu Ile Tyr Ser Asp Val Ile Asn Gly Glu Ile Tyr Gly Leu
305                 310                 315                 320
Met Thr Pro Tyr Phe Ser Phe Glu Lys Ala Glu Ser Leu Tyr Thr Arg
                325                 330                 335
Ala Pro His Leu Phe Thr Trp Leu Lys Gly Phe Arg Phe Val Thr Asn
            340                 345                 350
Ser Ile Ser Tyr Trp Thr Phe Leu Ser Gly Gly Gln Asn Lys Tyr Ser
        355                 360                 365
Tyr Thr Asn Asn Ser Ser Ile Asn Glu Gly Ser Phe Arg Gly Gln Asp
    370                 375                 380
Thr Asp Tyr Gly Gly Thr Ser Ser Thr Ile Asn Ile Pro Ser Asn Ser
385                 390                 395                 400
Tyr Val Tyr Asn Leu Trp Thr Glu Asn Tyr Glu Tyr Ile Tyr Pro Trp
                405                 410                 415
Gly Asp Pro Val Asn Ile Thr Lys Met Asn Phe Ser Val Thr Asp Asn
            420                 425                 430
Asn Ser Ser Lys Glu Leu Ile Tyr Gly Ala His Arg Thr Asn Lys Pro
        435                 440                 445
Val Val Arg Thr Asp Phe Asp Phe Leu Thr Asn Lys Glu Gly Thr Glu
    450                 455                 460
Leu Ala Lys Tyr Asn Asp Tyr Asn His Ile Leu Ser Tyr Met Leu Ile
465                 470                 475                 480
Asn Gly Glu Thr Phe Gly Gln Lys Arg His Gly Tyr Ser Phe Ala Phe
                485                 490                 495
Thr His Ser Ser Val Asp Pro Asn Asn Thr Ile Ala Ala Asn Lys Ile
            500                 505                 510
Thr Gln Ile Pro Val Val Lys Ala Ser Ser Ile Asn Gly Ser Ile Ser
        515                 520                 525
Ile Glu Lys Gly Pro Gly Phe Thr Gly Gly Asp Leu Val Lys Met Arg
    530                 535                 540
Ala Asp Ser Gly Leu Thr Met Arg Phe Lys Ala Glu Leu Leu Asp Lys
545                 550                 555                 560
Lys Tyr Arg Val Arg Ile Arg Tyr Lys Cys Asn Tyr Ser Ser Lys Leu
                565                 570                 575
Ile Leu Arg Lys Trp Lys Gly Glu Gly Tyr Ile Gln Gln Gln Ile His
            580                 585                 590
Asn Ile Ser Pro Thr Tyr Gly Ala Phe Ser Tyr Leu Glu Ser Phe Thr
        595                 600                 605
Ile Thr Thr Thr Glu Asn Ile Phe Asp Leu Thr Met Glu Val Thr Tyr
    610                 615                 620
Pro Tyr Gly Arg Gln Phe Val Glu Asp Ile Pro Ser Leu Ile Leu Asp
625                 630                 635                 640
Lys Ile Glu Phe Leu Pro Thr Asn
                645
```

<210> 19
<211> 722
<212> PRT
<213> Bacillus thuringiensis

<400> 19

```
Met Lys Glu Gln Asn Leu Asn Lys Tyr Asp Glu Ile Thr Val Gln Ala
 1               5                  10                  15
Ala Ser Asp Tyr Ile Asp Ile Arg Pro Ile Phe Gln Thr Asn Gly Ser
            20                  25                  30
```

```
Ala Thr Phe Asn Ser Asn Thr Asn Ile Thr Thr Leu Thr Gln Ala Ile
        35                  40                  45
Asn Ser Gln Ala Gly Ala Ile Ala Gly Lys Thr Ala Leu Asp Met Arg
    50                  55                  60
His Asp Phe Thr Phe Arg Ala Asp Ile Phe Leu Gly Thr Lys Ser Asn
65                  70                  75                  80
Gly Ala Asp Gly Ile Ala Ile Ala Phe His Arg Gly Ser Ile Gly Phe
                85                  90                  95
Val Gly Thr Lys Gly Gly Gly Leu Gly Ile Leu Gly Ala Pro Lys Gly
            100                 105                 110
Ile Gly Phe Glu Leu Asp Thr Tyr Ala Asn Ala Pro Glu Asp Glu Val
        115                 120                 125
Gly Asp Ser Phe Gly His Gly Ala Met Lys Gly Ser Phe Pro Ser Phe
    130                 135                 140
Pro Asn Gly Tyr Pro His Ala Gly Phe Val Ser Thr Asp Lys Asn Ser
145                 150                 155                 160
Arg Trp Leu Ser Ala Leu Ala Gln Met Gln Arg Ile Ala Ala Pro Asn
                165                 170                 175
Gly Arg Trp Arg Arg Leu Glu Ile Arg Trp Asp Ala Arg Asn Lys Glu
            180                 185                 190
Leu Thr Ala Asn Leu Gln Asp Leu Thr Phe Asn Asp Ile Thr Val Gly
        195                 200                 205
Glu Lys Pro Arg Thr Pro Arg Thr Ala Thr Trp Arg Leu Val Asn Pro
    210                 215                 220
Ala Phe Glu Leu Asp Gln Lys Tyr Thr Phe Val Ile Gly Ser Ala Thr
225                 230                 235                 240
Gly Ala Ser Asn Asn Leu His Gln Ile Gly Ile Ile Glu Phe Asp Ala
                245                 250                 255
Tyr Phe Thr Lys Pro Thr Ile Glu Ala Asn Asn Val Asn Val Pro Val
            260                 265                 270
Gly Ala Thr Phe Asn Pro Lys Thr Tyr Pro Gly Ile Asn Leu Arg Ala
        275                 280                 285
Thr Asp Glu Ile Asp Gly Asp Leu Thr Ser Lys Ile Ile Val Lys Ala
    290                 295                 300
Asn Asn Val Asn Thr Ser Lys Thr Gly Val Tyr Tyr Val Thr Tyr Tyr
305                 310                 315                 320
Val Glu Asn Ser Tyr Gly Glu Ser Asp Glu Lys Thr Ile Glu Val Thr
                325                 330                 335
Val Phe Ser Asn Pro Thr Ile Ile Ala Ser Asp Val Glu Ile Glu Lys
            340                 345                 350
Gly Glu Ser Phe Asn Pro Leu Thr Asp Ser Arg Val Gly Leu Ser Ala
        355                 360                 365
Gln Asp Ser Leu Gly Asn Asp Ile Thr Gln Asn Val Lys Val Lys Ser
    370                 375                 380
Ser Asn Val Asp Thr Ser Lys Pro Gly Glu Tyr Glu Val Val Phe Glu
385                 390                 395                 400
Val Thr Asp Ser Phe Gly Gly Lys Ala Glu Lys Asp Phe Lys Val Thr
                405                 410                 415
Val Leu Gly Gln Pro Ser Ile Glu Ala Asn Asn Val Glu Leu Glu Ile
            420                 425                 430
Asp Asp Ser Leu Asp Pro Leu Thr Asp Ala Lys Val Gly Leu Arg Ala
        435                 440                 445
Lys Asp Ser Leu Gly Asn Asp Ile Thr Lys Asp Ile Lys Val Lys Phe
    450                 455                 460
Asn Asn Val Asp Thr Ser Asn Ser Gly Lys Tyr Glu Val Ile Phe Glu
465                 470                 475                 480
Val Thr Asp Arg Phe Gly Lys Lys Ala Glu Lys Ser Ile Glu Val Leu
```

```
                485                 490                 495
Val Leu Gly Glu Pro Ser Ile Glu Ala Asn Asp Val Glu Val Asn Lys
            500                 505                 510
Gly Glu Thr Phe Glu Pro Leu Thr Asp Ser Arg Val Gly Leu Arg Ala
        515                 520                 525
Lys Asp Ser Leu Gly Asn Asp Ile Thr Lys Asp Val Lys Ile Lys Ser
    530                 535                 540
Ser Asn Val Asp Thr Ser Lys Pro Gly Glu Tyr Glu Val Val Phe Glu
545                 550                 555                 560
Val Thr Asp Arg Phe Gly Lys Tyr Val Glu Lys Thr Ile Gly Val Ile
                565                 570                 575
Val Pro Val Ile Asp Asp Glu Trp Glu Asp Gly Asn Val Asn Gly Trp
            580                 585                 590
Lys Phe Tyr Ala Gly Gln Asp Ile Lys Leu Leu Lys Asp Pro Asp Lys
        595                 600                 605
Ala Tyr Lys Gly Asp Tyr Val Phe Tyr Asp Ser Arg His Val Ala Ile
    610                 615                 620
Ser Lys Thr Ile Pro Leu Thr Asp Leu Gln Ile Asn Thr Asn Tyr Glu
625                 630                 635                 640
Ile Thr Val Tyr Ala Lys Ala Glu Ser Gly Asp His His Leu Lys Val
                645                 650                 655
Thr Tyr Lys Lys Asp Pro Ala Gly Pro Glu Glu Pro Pro Val Phe Asn
            660                 665                 670
Arg Leu Ile Ser Thr Gly Thr Leu Val Glu Lys Asp Tyr Arg Glu Leu
        675                 680                 685
Lys Gly Thr Phe Arg Val Thr Glu Leu Asn Lys Ala Pro Leu Ile Ile
    690                 695                 700
Val Glu Asn Phe Gly Ala Gly Tyr Ile Gly Gly Ile Arg Ile Val Lys
705                 710                 715                 720
Ile Ser
```

<210> 20
<211> 674
<212> PRT
<213> Bacillus thuringiensis

```
<400> 20
Met Asn Gln Tyr Gln Asn Lys Asn Glu Tyr Glu Ile Leu Glu Ser Ser
 1               5                  10                  15
Gln Asn Asn Met Asn Met Pro Asn Arg Tyr Pro Phe Ala Asp Asp Pro
            20                  25                  30
Asn Ala Val Met Lys Asn Gly Asn Tyr Lys Asp Trp Val Asn Glu Cys
        35                  40                  45
Glu Gly Ser Asn Ile Ser Pro Ser Pro Ala Ala Ala Ile Thr Ser Lys
    50                  55                  60
Ile Val Ser Ile Val Leu Lys Thr Leu Ala Lys Ala Val Ala Ser Ser
65                  70                  75                  80
Leu Ala Asp Ser Ile Lys Ser Ser Leu Gly Ile Ser Lys Thr Ile Thr
                85                  90                  95
Glu Asn Asn Val Ser Gln Val Ser Met Val Gln Val His Gln Ile Ile
            100                 105                 110
Asn Arg Arg Ile Gln Glu Thr Ile Leu Asp Leu Gly Glu Ser Ser Leu
        115                 120                 125
Asn Gly Leu Val Ala Ile Tyr Asn Arg Asp Tyr Leu Gly Ala Leu Glu
    130                 135                 140
```

```
Ala Trp Asn Asn Asn Lys Ser Asn Ile Asn Tyr Gln Thr Asn Val Ala
145                 150                 155                 160
Glu Ala Phe Lys Thr Val Glu Arg Glu Phe Phe Thr Lys Leu Lys Gly
                165                 170                 175
Ile Tyr Arg Thr Ser Ser Ser Gln Ile Thr Leu Leu Pro Thr Phe Thr
            180                 185                 190
Gln Ala Ala Asn Leu His Leu Ser Met Leu Arg Asp Ala Val Met Tyr
        195                 200                 205
Gln Glu Gly Trp Asn Leu Gln Ser His Ile Asn Tyr Ser Lys Glu Leu
    210                 215                 220
Asp Asp Ala Leu Glu Asp Tyr Thr Asn Tyr Cys Val Glu Val Tyr Thr
225                 230                 235                 240
Lys Gly Leu Asn Ala Leu Arg Gly Ser Thr Ala Ile Asp Trp Leu Glu
                245                 250                 255
Phe Asn Ser Phe Arg Arg Asp Met Thr Leu Met Val Leu Asp Leu Val
            260                 265                 270
Ala Ile Phe Pro Asn Tyr Asn Pro Val Arg Tyr Pro Leu Ser Thr Lys
        275                 280                 285
Ile Ser Leu Ser Arg Lys Ile Tyr Thr Asp Pro Val Gly Arg Thr Asp
    290                 295                 300
Ser Pro Ser Phe Gly Asp Trp Thr Asn Thr Gly Arg Thr Leu Ala Asn
305                 310                 315                 320
Phe Asn Asp Leu Glu Arg Glu Val Thr Asp Ser Pro Ser Leu Val Lys
                325                 330                 335
Trp Leu Gly Asp Met Thr Ile Tyr Thr Gly Ala Ile Asp Ser Tyr Arg
            340                 345                 350
Pro Thr Ser Pro Gly Asp Arg Ile Gly Val Trp Tyr Gly Asn Ile Asn
        355                 360                 365
Ala Phe Tyr His Thr Gly Arg Thr Asp Val Val Met Phe Arg Gln Thr
    370                 375                 380
Gly Asp Thr Ala Tyr Glu Asp Pro Ser Thr Phe Ile Ser Asn Ile Leu
385                 390                 395                 400
Tyr Asp Asp Ile Tyr Lys Leu Asp Leu Arg Ala Ala Ala Val Ser Thr
                405                 410                 415
Ile Gln Gly Ala Met Asp Thr Thr Phe Gly Val Ser Ser Ser Arg Phe
            420                 425                 430
Phe Asp Ile Arg Gly Arg Asn Gln Leu Tyr Gln Ser Asn Lys Pro Tyr
        435                 440                 445
Pro Ser Leu Pro Ile Thr Ile Thr Phe Pro Gly Glu Glu Ser Ser Glu
    450                 455                 460
Gly Asn Ala Asn Asp Tyr Ser His Leu Leu Cys Asp Val Lys Ile Leu
465                 470                 475                 480
Gln Glu Asp Ser Ser Asn Ile Cys Glu Gly Arg Ser Ser Leu Leu Ser
                485                 490                 495
His Ala Trp Thr His Ala Ser Leu Asp Arg Asn Asn Thr Ile Leu Pro
            500                 505                 510
Asp Glu Ile Thr Gln Ile Pro Ala Val Thr Ala Tyr Glu Leu Arg Gly
        515                 520                 525
Asn Ser Ser Val Val Ala Gly Pro Gly Ser Thr Gly Gly Asp Leu Val
    530                 535                 540
Lys Met Ser Tyr His Ser Val Trp Ser Phe Lys Val Tyr Cys Ser Glu
545                 550                 555                 560
Leu Lys Asn Tyr Arg Val Arg Ile Arg Tyr Ala Ser His Gly Asn Cys
                565                 570                 575
Gln Phe Leu Met Lys Arg Trp Pro Ser Thr Gly Val Ala Pro Arg Gln
            580                 585                 590
Trp Ala Arg His Asn Val Gln Gly Thr Phe Ser Asn Ser Met Arg Tyr
```

```
        595                 600                 605
Glu Ala Phe Lys Tyr Leu Asp Ile Phe Thr Ile Thr Pro Glu Glu Asn
    610                 615                 620
Asn Phe Ala Phe Thr Ile Asp Leu Glu Ser Gly Gly Asp Leu Phe Ile
625                 630                 635                 640
Asp Lys Ile Glu Phe Ile Pro Val Ser Gly Ser Ala Phe Glu Tyr Glu
                645                 650                 655
Gly Lys Gln Asn Ile Glu Lys Thr Gln Lys Ala Val Asn Asp Leu Phe
            660                 665                 670
Ile Asn
```

<210> 21
<211> 675
<212> PRT
<213> Bacillus thuringiensis

<400> 21

```
Met Asn Pro Tyr Gln Asn Lys Ser Glu Cys Glu Ile Leu Asn Ala Pro
 1               5                  10                  15
Leu Asn Asn Ile Asn Met Pro Asn Arg Tyr Pro Phe Ala Asn Asp Pro
            20                  25                  30
Asn Ala Val Met Lys Asn Gly Asn Tyr Lys Asp Trp Leu Asn Glu Cys
        35                  40                  45
Asp Gly Ile Thr Pro Ser Ile Phe Gly Thr Leu Gly Val Leu Ala Ser
    50                  55                  60
Ile Val Ile Ser Thr Ile Asn Leu Ala Thr Ser Pro Ser Ile Gly Asp
65                  70                  75                  80
Ala Phe Ala Leu Val Ser Ser Ile Gly Glu Tyr Trp Pro Glu Thr Lys
                85                  90                  95
Thr Ser Phe Pro Leu Ser Val Ala Asp Val Asn Arg Leu Ile Arg Glu
            100                 105                 110
Ala Leu Asp Gln Asn Ala Ile Asn Arg Ala Thr Gly Lys Phe Asn Gly
        115                 120                 125
Leu Met Asp Thr Tyr Asn Thr Val Tyr Leu Lys Asn Leu Gln Asp Trp
    130                 135                 140
Tyr Asp Thr Arg Ile Pro Ala Asn Pro Gln Gly Asp Ser Gln Leu Arg
145                 150                 155                 160
Glu Ala Ala Arg Arg Ser Leu Glu Glu Ile Glu Arg Asp Phe Arg Lys
                165                 170                 175
Ala Leu Ala Gly Glu Phe Ala Glu Ala Gly Ser Gln Ile Val Leu Leu
            180                 185                 190
Pro Ile Tyr Ala Gln Ala Ala Asn Ile His Leu Leu Ile Leu Lys Asp
        195                 200                 205
Ala Met Gln Phe Arg Thr Asp Leu Gly Leu Ile Arg Pro Val Gly Val
    210                 215                 220
Pro Ile Thr Thr Ser Ala Glu Asp Pro Phe Glu Ser Glu Phe Leu Leu
225                 230                 235                 240
Arg Ile Lys Lys Tyr Thr Asp His Cys Ile Ser Tyr Tyr Asp Asp Gly
                245                 250                 255
Leu Ala Lys Ile Arg Ser Arg Gly Ser Asp Gly Glu Thr Trp Trp Glu
            260                 265                 270
Phe Asn Lys Phe Arg Arg Glu Met Thr Leu Thr Val Leu Asp Leu Val
        275                 280                 285
Ala Leu Tyr Pro Thr His Asn Ile Lys Leu Tyr Pro Ile Pro Thr Gln
    290                 295                 300
```

```
Thr Glu Leu Ser Arg Val Val Tyr Thr Asp Pro Val Gly Cys Phe Gly
305                 310                 315                 320
Asn Arg Lys Ser Asp Ile Phe Ser Arg Leu Asn Phe Asp Tyr Leu Glu
                325                 330                 335
Asn Arg Leu Thr Arg Pro Arg Glu Pro Phe Asn Tyr Leu Asn Ser Val
            340                 345                 350
Gln Leu Phe Ala Ser Thr Val Ser Asn Ser Asn Asn Gly Glu Val Leu
        355                 360                 365
Arg Gly Asn Leu Asn Lys Ile Met Phe Glu Gly Gly Trp Thr Ala Ser
    370                 375                 380
Arg Ser Gly Asp Gly Val Thr Thr Gly Thr Pro Phe Ser Thr Met Asp
385                 390                 395                 400
Trp Ser Tyr Gly Trp Gly Tyr Pro Arg Lys His Tyr Ala Glu Ile Thr
                405                 410                 415
Ser Arg Ser Gln Ala Leu Pro Gly Leu Asn Asn Ser Ile His Val Ile
            420                 425                 430
Val Gly Ile Asp Ser Phe Arg Ala Ile Gly Pro Gly Gly Gln Gly Asp
        435                 440                 445
His Thr Phe Ser Leu Pro Gly Gly Asp Met Tyr Asp Cys Gly Lys Val
    450                 455                 460
Gln Ile Asn Pro Leu Glu Asp Tyr Arg Asn Ser Asp His Trp Ile Ser
465                 470                 475                 480
Asp Met Met Thr Ile Asn Gln Ser Val Gln Leu Ala Ser Asn Pro Thr
                485                 490                 495
Gln Thr Phe Ala Phe Ser Ala Leu Ser Leu Gly Trp His His Ser Ser
            500                 505                 510
Ala Gly Asn Arg Asn Val Tyr Val Tyr Asp Lys Ile Thr Gln Ile Pro
        515                 520                 525
Ala Thr Lys Thr Val Arg Glu His Pro Met Ile Lys Gly Pro Gly Phe
    530                 535                 540
Thr Gly Gly Asp Leu Ala Asp Leu Ser Ser Asn Ser Asp Ile Leu Gln
545                 550                 555                 560
Tyr Asp Leu Arg Ser Asp Tyr Asp Asp Arg Leu Thr Glu Asp Val Pro
                565                 570                 575
Phe Arg Ile Arg Ile Arg Cys Ala Ser Ile Gly Val Ser Thr Ile Ser
            580                 585                 590
Val Asp Asn Trp Gly Ser Ser Ser Pro Gln Val Thr Val Ala Ser Thr
        595                 600                 605
Ala Ala Ser Leu Asp Thr Leu Lys Tyr Glu Ser Phe Gln Tyr Val Ser
    610                 615                 620
Ile Pro Gly Asn Tyr Tyr Phe Asp Ser Ala Pro Arg Ile Arg Leu Leu
625                 630                 635                 640
Arg Gln Pro Gly Arg Leu Leu Val Asp Arg Ile Glu Ile Ile Pro Val
                645                 650                 655
Asn Phe Phe Pro Leu Ser Glu Gln Glu Asn Lys Ser Val Asp Ser Leu
            660                 665                 670
Phe Ile Asn
        675
```

<210> 22
<211> 659
<212> PRT
<213> Bacillus thuringiensis

<400> 22
Asn Ser Tyr Glu Asn Lys Asn Glu Tyr Glu Ile Leu Asn Asp Ser Lys

```
 1               5                  10                  15
Lys Ser Asn Met Ser Asn Pro Tyr Leu Arg Tyr Pro Leu Ala Asn Asp
            20                  25                  30
Ser Leu Ala Ser Met Gln Asn Thr Asn Tyr Lys Asp Trp Leu Thr Met
        35                  40                  45
Cys Asp Arg Thr Asp Thr Asp Val Leu Ser Ser Arg Gly Ala Val Ser
    50                  55                  60
Thr Gly Val Gly Met Leu Ser Thr Ile Leu Ser Leu Phe Gly Ile Pro
65                  70                  75                  80
Leu Ile Gly Glu Gly Ile Asp Leu Leu Leu Gly Ala Ala Asp Phe Leu
                85                  90                  95
Trp Pro Glu Ser Asp Gly Gly His Gln Tyr Thr Trp Glu Asp Leu Met
            100                 105                 110
Asn His Ile Glu Glu Leu Met Asp Glu Arg Leu Glu Thr Glu Lys Arg
        115                 120                 125
Thr Thr Ala Leu Asp Asp Leu Arg Gly Leu Lys Ala Leu Leu Gly Leu
    130                 135                 140
Phe Arg Asp Ala Phe Asp Ser Trp Glu Lys Asn Gln Asn Asp Pro Ile
145                 150                 155                 160
Ala Lys Asn Arg Val Gly Gly Tyr Phe Glu Asp Val His Thr His Phe
                165                 170                 175
Val Lys Asp Met Ala Ser Ile Phe Ser Ala Thr Asn Tyr Glu Val Leu
            180                 185                 190
Leu Leu Pro Val Tyr Ala Gln Ala Ala Asn Leu His Leu Leu Leu Leu
        195                 200                 205
Arg Glu Gly Val Ile Tyr Gly Ser Arg Trp Gly Ile Ala Pro Ala Ala
    210                 215                 220
Asp Phe Tyr His Asp Gln Leu Leu Lys Tyr Thr Ala Ile Tyr Ala Asn
225                 230                 235                 240
His Cys Val Thr Trp Tyr Asn Asn Gly Leu Ala Gln Gln Lys Glu Leu
                245                 250                 255
Phe Ala Lys Ser Pro Asn Trp Asn Arg Phe Asn Ala Tyr Arg Arg Asp
            260                 265                 270
Met Thr Ile Thr Val Leu Asp Ile Ile Ala Leu Phe Pro Thr Tyr Asp
        275                 280                 285
Ala Arg Leu Tyr Thr Lys Pro Ile Lys Thr Glu Leu Thr Arg Glu Ile
    290                 295                 300
Tyr Ser Asp Val Leu Asn Leu Asp Val Tyr Gly Val Gln Gln Thr Asp
305                 310                 315                 320
Leu Asn Lys Asn Glu Ala Ala Phe Thr Arg Ser Pro His Leu Val Thr
                325                 330                 335
Arg Leu Arg Gly Phe Asp Phe Tyr Thr Arg Thr Lys Tyr Ala Tyr Trp
            340                 345                 350
Arg Tyr Leu Ala Gly His Thr Asn Tyr Phe Ser Phe Thr Gly Asn Gly
        355                 360                 365
Thr Ile Tyr Ser Ser Ser Phe Asn Asn Trp Tyr Asp Thr Asp Met Thr
    370                 375                 380
Lys Ser Thr Ile Asn Ile Pro Asp Tyr Ala Asn Ile Tyr Lys Leu Trp
385                 390                 395                 400
Thr Lys Ser Tyr Thr Asn Ile Ser Pro Tyr Thr Asp Pro Val Gly Ile
                405                 410                 415
Ser Gln Met Gln Phe Ser Leu Thr Asn Asn Gln Gln Leu Thr Tyr Thr
            420                 425                 430
Gly Thr Ser Ala Pro Lys Tyr Pro Val Arg Glu Thr Phe Phe Glu Ile
        435                 440                 445
Pro Pro Thr Asp Glu Lys Pro Leu Thr Tyr Glu Asn Tyr Ser His Ile
    450                 455                 460
```

```
Leu Ser Tyr Met Thr Ser Ala Gln His Phe Gly Asp Lys Lys Ile Gly
465                 470                 475                 480
Tyr Thr Phe Ala Trp Met His Glu Ser Val Asp Phe Asp Asn Arg Val
                485                 490                 495
Asp Pro Asp Lys Ile Thr Gln Ile Pro Ala Val Lys Gly Asp Tyr Leu
            500                 505                 510
Gln Tyr Gly Tyr Val Lys Gln Gly Pro Gly His Thr Gly Gly Asp Leu
        515                 520                 525
Val Ser Met Ile Arg Thr Asp Arg Leu Gly Ile Asn Val Tyr Phe Pro
    530                 535                 540
Gln Pro Leu Asp Tyr Arg Ile Arg Ile Arg Tyr Ser Thr Ser Ser Asn
545                 550                 555                 560
Gly Tyr Leu Tyr Ile Tyr Ser Pro Asn Thr Lys Ile Val Tyr Leu Pro
                565                 570                 575
Pro Thr Thr Leu Val Asp Gly Gln Pro Thr Phe Asp Pro Met Asp Phe
            580                 585                 590
Ser Ala Phe Arg Val Val Glu Val Pro Ala Ser Phe Arg Ala Ser Val
        595                 600                 605
Ala Gly Tyr Thr Asn Phe Thr Ile Glu Ala Gly Phe Gly Pro Val Tyr
    610                 615                 620
Ile Asp Lys Ile Glu Phe Ile Pro Asp Asn Thr Thr Thr Leu Glu Tyr
625                 630                 635                 640
Glu Gly Gly Arg Asp Leu Glu Lys Thr Lys Asn Ala Val Asn Asp Leu
                645                 650                 655
Phe Thr Asn
```

<210> 23
<211> 666
<212> PRT
<213> Bacillus thuringiensis

<400> 23

```
Asn Ser Tyr Glu Asn Lys Asn Glu Tyr Glu Ile Leu Glu Ser Ser Ser
 1               5                  10                  15
Asn Asn Thr Asn Met Pro Asn Arg Tyr Pro Phe Ala Asn Asp Arg Asp
            20                  25                  30
Met Ser Thr Met Ser Phe Asn Asp Cys Gln Gly Ile Ser Trp Asp Glu
        35                  40                  45
Ile Trp Glu Ser Ala Glu Thr Ile Thr Ser Ile Gly Ile Asp Leu Ile
    50                  55                  60
Glu Phe Leu Met Glu Pro Ser Leu Gly Gly Ile Asn Thr Leu Phe Ser
65                  70                  75                  80
Ile Ile Gly Lys Leu Ile Pro Thr Asn His Gln Ser Val Ser Ala Leu
                85                  90                  95
Ser Ile Cys Asp Leu Leu Ser Ile Ile Arg Lys Glu Val Ala Asp Ser
            100                 105                 110
Val Leu Ser Asp Ala Ile Cys Arg Phe Leu Asp Gly Lys Leu Lys Asn
        115                 120                 125
Tyr Arg Glu Tyr Tyr Leu Pro Tyr Leu Glu Ala Trp Leu Lys Asp Gly
    130                 135                 140
Lys Pro Leu Gln Lys Thr Asn Asn Ser Asp Ile Gly Gln Leu Val Lys
145                 150                 155                 160
Tyr Phe Glu Leu Ser Glu Arg Asp Phe Asn Glu Ile Leu Gly Gly Ser
                165                 170                 175
Leu Ala Arg Asn Asn Ala Gln Ile Leu Leu Leu Pro Tyr Phe Cys Ala
```

```
            180                 185                 190
Ser Cys Lys Cys Gln Leu Leu Leu Leu Arg Asp Ala Val Gln Tyr Glu
        195                 200                 205
Glu Gln Trp Phe Pro Phe Leu Ser Ala Glu Asn Val Arg Ser Glu Leu
    210                 215                 220
Ile Ser Pro Asn Ser Gly Cys Asp Phe Thr Gly Asp Tyr Tyr Glu Arg
225                 230                 235                 240
Leu Lys Cys Lys Ile Ala Glu Tyr Thr Asp Tyr Cys Glu Tyr Trp Tyr
                245                 250                 255
Gln Ala Gly Leu Asn Gln Ile Lys Gln Ala Gly Thr Gly Ala Asp Thr
            260                 265                 270
Trp Ala Lys Phe Asn Lys Phe Arg Arg Glu Met Thr Leu Thr Val Leu
        275                 280                 285
Asp Ile Ile Ala Ile Phe Gln Thr Tyr Asp Phe Lys Lys Tyr Pro Leu
    290                 295                 300
Pro Thr His Val Glu Leu Thr Arg Glu Ile Tyr Thr Asp Pro Val Gly
305                 310                 315                 320
Tyr Ser Ser Gly Thr Tyr Ser Trp Leu Lys Tyr Trp Thr Gly Ala Phe
                325                 330                 335
Asn Thr Leu Glu Ala Asn Gly Thr Arg Gly Pro Gly Leu Val Thr Trp
            340                 345                 350
Leu Arg Ser Ile Gly Ile Tyr Asn Glu Tyr Val Ser Arg Tyr Phe Ser
        355                 360                 365
Gly Trp Val Gly Thr Arg His Tyr Glu Asp Tyr Thr Thr Gly Asn Gly
    370                 375                 380
Asn Phe Gln Arg Met Ser Gly Thr Thr Ser Asn Asp Leu Arg Asp Ile
385                 390                 395                 400
Ser Phe Pro Asn Ser Asp Ile Phe Lys Ile Glu Ser Lys Ala Ile Met
                405                 410                 415
Asn Leu Val Gly Glu Ile Asn Ala Arg Pro Glu Tyr Arg Val Ser Arg
            420                 425                 430
Ala Glu Phe Ser Glu Ser Thr Ala Phe Ile Tyr Leu Tyr Asp Ala Gly
        435                 440                 445
Asn Ser Gly Leu Ser Ser Met Thr Ile Thr Ser Lys Leu Pro Gly Ile
    450                 455                 460
Lys Asn Pro Glu Pro Ser Tyr Arg Asp Tyr Ser His Arg Leu Ser Asn
465                 470                 475                 480
Ala Ala Cys Val Gly Ala Gly Asn Ser Arg Ile Asn Val Tyr Gly Trp
                485                 490                 495
Thr His Thr Ser Met Ser Lys Tyr Asn Leu Ile Tyr Pro Asp Lys Ile
            500                 505                 510
Thr Gln Ile Pro Ala Val Lys Ala Phe Asp Ile Ser Asp Thr Gly Pro
        515                 520                 525
Gly Gln Val Ile Ala Gly Pro Gly His Thr Gly Gly Asn Val Val Ser
    530                 535                 540
Leu Pro Tyr Tyr Ser Arg Leu Lys Ile Arg Leu Ile Pro Ala Ser Thr
545                 550                 555                 560
Asn Lys Asn Tyr Leu Val Arg Val Arg Tyr Thr Ser Thr Ser Asn Gly
                565                 570                 575
Arg Leu Leu Val Glu Arg Trp Ser Pro Ser Ser Ile Ile Asn Ser Tyr
            580                 585                 590
Phe Phe Leu Pro Ser Thr Gly Pro Gly Asp Ser Phe Gly Tyr Val Asp
        595                 600                 605
Thr Leu Val Thr Thr Phe Asn Gln Pro Gly Val Glu Ile Ile Ile Gln
    610                 615                 620
Asn Leu Asp Thr Pro Ile Asn Val Asp Lys Val Glu Phe Ile Pro Val
625                 630                 635                 640
```

```
Asn Ser Thr Ala Leu Glu Tyr Glu Gly Lys Gln Ser Leu Glu Lys Ala
                645                 650                 655
Gln Asp Val Val Asn Asp Leu Phe Val Lys
            660                 665
```